

**WL-TR-95-4005**

**FUNDAMENTAL SKILLS TUTORING  
PROJECT, YEAR II  
DAYTON, OHIO AREA**



**Sue S. Elling  
Sue F. Rinehart  
Alliance for Education  
2100 Kettering Tower  
Dayton, Ohio 45423**

**Katie E. G. Thorp  
University of Dayton Research Institute  
300 College Park  
Dayton, Ohio 45469-1068**

**DECEMBER 1994**

**Interim Report for Period August 1993 to September 1994**

**Approved for public release; distribution is unlimited.**

**MATERIALS DIRECTORATE  
WRIGHT LABORATORY  
AIR FORCE MATERIEL COMMAND  
WRIGHT-PATTERSON AIR FORCE BASE, OH 45433-7734**

**19950622 023**

## NOTICE

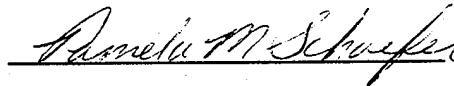
When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely Government-related procurement, the United States Government incurs no responsibility or any obligation whatsoever. The fact that the Government may have formulated or in any way supplied the said drawings, specifications, or other data, is not to be regarded by implication, or otherwise in any manner construed, as licensing the holder, or any other person or corporation; or as conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

This report is releasable to the National Technical Information Service (NTIS). At NTIS, it will be available to the general public, including foreign nations.

This technical report has been reviewed and is approved for publication.



W. WADE ADAMS  
Hardened Materials Technology Section  
Hardened Materials Branch



PAMELA SCHAEFER, Acting Chief  
Hardened Materials Branch  
Electromagnetic Materials and  
Survivability Division



WILLIAM R. WOODY, Chief  
Electromagnetic Materials and  
Survivability Division

If your address has changed, if you wish to be removed from our mailing list, or if the addressee is no longer employed by your organization please notify WL/MLPJ, Wright-Patterson AFB, OH 45433-7702 to help maintain a current mailing list.

Copies of this report should not be returned unless return is required by security considerations, contractual obligations, or notice on a specific document.

REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.				
1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE 31 December 1994		3. REPORT TYPE AND DATES COVERED Interim - 1 Aug 93 - 30 Sep 94
4. TITLE AND SUBTITLE Fundamental Skills Tutoring Project, Year II Dayton Ohio Area			5. FUNDING NUMBERS  PE 62102 PR 2422 TA 02 WU TU	
6. AUTHOR(S)  Sue S. Elling, Sue F. Rinehart, Katie E.G. Thorp				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)  Alliance for Education 2100 Kettering Tower Dayton, OH 45423			8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)  Materials Directorate Wright Laboratory Air Force Materiel Command Wright-Patterson AFB, OH 45433-7702			10. SPONSORING/MONITORING AGENCY REPORT NUMBER  WL-TR-95-4005	
11. SUPPLEMENTARY NOTES  Joint effort--Alliance for Education & Materials Directorate				
12a. DISTRIBUTION / AVAILABILITY STATEMENT  APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED.			12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words)  The Intelligent Training Branch of the Technical Training Research Division of the Air Force Armstrong Laboratory is developing a series of software packages designed to train high school students in Algebra, English and Life Science classes in problem solving and critical thinking. The Alliance for Education was awarded a grant from the Air Force Wright Laboratory to assist Armstrong Laboratory in its research by developing local research sites in Dayton area schools to test the effectiveness of the tutors as they are developed.  The Alliance for Education was tasked with selecting schools, purchasing, installing and maintaining hardware, supporting local teachers and administrators, and assisting Armstrong Laboratory personnel with implementation of their research program.  Year Two of this project involved research on an Algebra word problem solving tutor and an English reading and writing tutor, training additional teachers, retraining past teachers on operation of newer versions of the software, installation of additional equipment, provisions for technical support, public relations and program evaluation.				
14. SUBJECT TERMS  Intelligent Tutor Educational Outreach Algebra			15. NUMBER OF PAGES 140	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT UNCLASSIFIED		18. SECURITY CLASSIFICATION OF THIS PAGE UNCLASSIFIED	19. SECURITY CLASSIFICATION OF ABSTRACT UNCLASSIFIED	20. LIMITATION OF ABSTRACT  UL

## TABLE OF CONTENTS

SECTION	PAGE
TABLES	iv
1.0 INTRODUCTION	1
1.1 Background	1
1.2 Definition of Terms	1
2.0 LOCAL PROJECT OBJECTIVES	2
3.0 ALLIANCE FOR EDUCATION RESPONSIBILITIES	5
4.0 YEAR TWO TIMELINE	7
5.0 YEAR TWO RESEARCH DESIGN	8
5.1 Reading and Writing (R-WISE) Tutor	8
5.1.1 Description of the Tutor	8
5.1.2 R-WISE Research Design	8
5.1.3 Armstrong Laboratory's Role in Evaluation	9
5.2 Word Problem Solving (WPS) Tutor	9
5.2.1 Description of Tutor	9
5.2.2 WPS Year Two Research Design	10
5.2.3 Armstrong Laboratory's Role in Evaluation	10
5.3 Local Qualitative Research Project	11
6.0 YEAR THREE (1994-1995)	12
6.1 Maintenance Year	12
6.2 Year Three Research Design	12
7.0 NEXT STEPS	14
8.0 ADDITIONAL ACTIVITIES	15
Appendix A Summary of: Final Report: Qualitative Research in Two Ohio School Districts	16
Appendix B January 1994 <u>State of Ohio Board of Education</u> <u>School Slate</u> article entitled "Staff, students committed to success: Dunbar seniors make notable gains on proficiency tests"	120
Appendix C March 3, 1994 <u>Dayton Daily News</u> article entitled "Voinovich promotes computer plan at Dunbar"	121
Appendix D Excerpts from 1994 Project GEMMA Program Evaluation	122

# TABLES

## TABLE

## PAGE

- 1 Local High School Treatment & Non-Treatment Groups  
Involved in Year Two Research

9

Accession For	
NTIS CRA&I	<input checked="" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification .....	
By .....	
Distribution /	
Availability Codes	
Dist	Avail and/or Special
A-1	

## SECTION 1.0: INTRODUCTION

### 1.1 Background

The U.S. Air Force Armstrong Laboratory at Brooks Air Force Base in San Antonio, Texas is researching the application of the Air Force's artificial intelligence technology in public schools through a series of computer-based tutors using Intelligent Tutoring Systems (ITS) technology.

Wright Laboratory at Wright-Patterson Air Force Base signed a Memorandum of Understanding with all of the Air Force superlabs to support Armstrong Laboratory research. Wright Laboratory then enlisted the assistance of the Alliance for Education and awarded the Alliance for Education a grant to administer and implement the local component of the project.

The Alliance for Education is a nonprofit organization which is a coalition of industry, education and government, acting as a third-party advocate to improve education. The Alliance for Education is independent of local school districts, but works closely with them. The Alliance for Education developed the title "Project F.A.S.T. Track" (Fundamental Academic Skills Training) for reference to the local component of this national project.

Wright Laboratory originally awarded the grant to the Alliance for Education in 1992 for one year with a renewal option for two additional years. This report covers activities during Year Two of the project. Refer to WL-TR-94-4023 for information concerning Year One of the project. Activities of the first year involved site selection, site preparation, teacher training and support, provision of technical support, public relations and program evaluation.

### 1.2 Definition of Terms

- ♦ **Artificial Intelligence (AI) Technology:** Computer programs that attempt to achieve some type of intelligent behavior.
- ♦ **Intelligent Tutoring Systems (ITS) Technology:** Application of artificial intelligence that enhances the power of computer-based instruction by acting like an expert private tutor.
- ♦ **FST:** (acronym for Fundamental Skills Training) Program developed by Armstrong Laboratory.
- ♦ **R-WISE:** (acronym for Reading and Writing In a Supportive Environment) Reading and Writing Tutor; primary focus for Year Two research.
- ♦ **WRITE:** (acronym for Writing and Reading In a Technological Environment ) Software, which included word processing, utilized by the non-treatment English classes during Year Two of the research.
- ♦ **WPS:** (acronym for Word Problem Solving) Tutor used by mathematics students, which was primary focus for Year One research.

## **SECTION 2.0: LOCAL PROJECT OBJECTIVES**

The Alliance for Education has organized and administered the local project to meet the following objectives:

**I. To obtain research data on the effectiveness of the Intelligent Tutoring System (ITS) of the Fundamental Skills Training (FST) Program for Armstrong Laboratory by establishing regional testing sites.**

- Primary responsibility for research design rests with the Air Force Armstrong Laboratory in San Antonio, Texas. Wright Laboratory at Wright-Patterson Air Force Base signed a Memorandum of Understanding with all of the Air Force superlabs to support Armstrong Laboratory research. Wright Laboratory then enlisted the assistance of the Alliance for Education and awarded the Alliance for Education a grant to administer and implement the local component of the project.
- FST computer laboratories have been established at Dayton Dunbar and Trotwood-Madison High Schools.
- Forty classes of 1,033 students used Dayton Dunbar and Trotwood-Madison High School FST computer labs an average of one day per week during the 1993-1994 school year.
- The local project collected data from both Dayton Dunbar and Trotwood-Madison High Schools and forwarded it to Armstrong Laboratory. It included
  - English and mathematics teachers' pre-and post-experience attitude surveys.
  - English students' online pre- and post-experience attitude surveys.
  - Mathematics students' online pre-and post-tests.
  - Mathematics and English students' online "journals" and "thought logs" in which they recorded personal observations regarding lab activities and the tutors.
- In cooperation with Armstrong Laboratory, the local project research team conducted qualitative research involving mathematics teachers and students. (A summary of their report is attached as Appendix A.)

**II. To deliver individualized instruction through transferring the technology of artificial intelligence applications to two public education systems in the Dayton area in**

**(a) a pre-Algebra word problem solving tutor**

**(b) an English reading and writing tutor**

- Each school lab contains 28 networked computer stations for students to use.
- In September, 1993, Armstrong Laboratory provided the Alliance for Education with versions of the WPS and R-WISE Tutors for use in the Dayton Dunbar and Trotwood-Madison High School FST computer labs.

- ♦ Twenty-three ninth grade English and 17 mathematics classes used the FST computer labs an average of one day per week.
- ♦ Mathematics teachers selected curriculum "modules" (e.g., Algebraic equations, area or perimeter of triangles, decimals, percentages, or ratios) for each lab session. Then students worked through problems at their own pace and in a somewhat random order so that all were not on the same problem at the same time.
- ♦ English teachers based their lab activities on readings provided by Armstrong Laboratory or their own selected readings. After reviewing the readings together, each student then completed a writing assignment online, using a specific R-WISE tool.
  - "Treatment" group classes had access to all R-WISE tools, including those in which artificial intelligence was imbedded. Those tools included "Cubing" for idea development, "Idea Board" for brainstorming and outlining, and "Re-vision" for editing.
  - Both "treatment" and "non-treatment" group classes had access to R-WISE tools in which artificial intelligence was *not* imbedded. Those tools included "Free-Writing" for warm-up, "Sticky Notes" for short, useful notes on reading assignments, "Thought Log" for answering prepared questions from the teacher, "Writing Pad" for word processing, and "Crossword Puzzle" for an extra activity following a reading assignment. The package of tools which did not contain imbedded artificial intelligence was termed "WRITE."

### **III. To develop student abilities to**

- (a) **use mathematical concepts in solving specific word problems, interpreting tables, graphs, charts and diagrams, and communicating mathematics-related concepts; and to**
  - (b) **efficiently and effectively read and write, using a logical sequence of steps including reading, comprehension, pre-writing, drafting, revision and editing.**
- ♦ During the 1993-1994 school year, Armstrong Laboratory personnel administered a comprehensive reading test and attitudinal survey online plus collected paper-and-pencil writing samples from the project's ninth grade English students in September, 1993 and again in May, 1994. Writing samples were scored by outside evaluators based on (1) holistic criteria which address the overall quality of the writing samples and (2) analytic criteria which address more specific skills, including abstraction, organization, purpose and development. Armstrong Laboratory agreed to disseminate their research findings to all test sites when completed.
  - ♦ Mathematics students also completed pre- and post-tests online for Armstrong Laboratory. However, at the time this report was prepared, Armstrong Laboratory personnel had not yet published their analysis of (1) comparison of 1993-1994 data with 1992-1993 data or (2) data collected from 1993-1994 classes using the "guided" versus "unguided" modes.
  - ♦ Locally, mathematics teachers were able to generate reports which indicated the number of problems each student attempted and solved, as well as number of times students requested help on each problem.
  - ♦ Local English teachers also printed out copies of students' completed assignments.



**IV. To facilitate the development of the application of domain-independent**  
**(a) problem-solving skills in solving mathematics problems.**  
**(b) critical thinking skills that underlie adult literacy.**

- ♦ To date, no formal research strategy has been designed to determine whether student behaviors learned through use of the WPS and R-WISE Tutors transfer to the classroom and beyond (near and far effect).
- During Year Three, Armstrong Laboratory has proposed that local evaluators focus on two issues relating to this objective:
  - ✓ Correlation between Ohio Proficiency Test performance and WPS/R-WISE usage
  - ✓ Relationship between student performance, environment, technologies (both hardware and software) and student behavior.

**V. To support school districts' efforts to increase student test scores on the Ohio Proficiency Test in (a) mathematics and (b) reading and writing.**

- ♦ Dayton district personnel, including administrators and teachers, credit their cohesive, committed Dunbar teaching staff, as well as student use of the FST Tutors with the significant increase in Dunbar students' scores on the Ohio Proficiency Test.
- ♦ Trotwood-Madison teachers began taking Workshop class students (tenth and eleventh grade students who have not yet passed the mathematics portion of the Proficiency Test) to the FST lab in 1993-1994 and continue doing so in 1994-1995.
- ♦ Local Year Three research will focus on whether there is any correlation between students' work on the WPS Tutor and their results on the Ohio Proficiency Test.

### **SECTION 3.0: ALLIANCE FOR EDUCATION RESPONSIBILITIES**

During Year Two, the task of the Alliance for Education was to coordinate all facets of the local project, including the following:

#### **I. Ensure Training and Support for Teachers and Site Coordinators**

- Arranged for three Trotwood-Madison and Dayton district curriculum specialists, as well as an Alliance for Education staff member, to accompany English teachers to the San Antonio, Texas training session in preparation for Year Two research.
- Held preliminary and follow-up sessions with English teachers and curriculum specialists to supplement the training they received in San Antonio.
- Enabled teachers to earn Continuing Education Units (CEU's) from the Ohio Department of Education for their participation in the San Antonio training.
- Regularly communicated with school site coordinators and met periodically with teachers and district personnel to ensure adequate support. Forwarded information to Armstrong Laboratory.
- Worked with Armstrong Laboratory to conduct a mini-training session in Dayton for local project mathematics teachers in preparation for a second year of research.
- Organized two joint meetings to address teacher concerns and research issues with Armstrong Laboratory personnel, English teachers, site coordinators, district supervisors and local team members.
- Reimbursed Dayton and Trotwood-Madison districts for the equivalent of one class period per day of each site coordinator's time to ensure adequate time to perform their duties.
- Paid stipends to participating English and mathematics teachers and site coordinators in recognition of their additional responsibilities.

#### **II. Facilitate the Local Project Team To Implement and Oversee the Project Goals and Ensure Adequate Staff and Technical Support.**

- Served as liaison for teachers, district administrators, and Air Force personnel at both Wright Laboratory and Armstrong Laboratory to ensure research issues were addressed.
- Contracted with the University of Dayton Research Institute for the services of Katie Thorp, associate research engineer, to provide technical assistance to the project and to assist the local evaluation team.
- Contracted with Dr. Phillip Messner, Wright State University associate professor of Educational Leadership, to lead the local research team during Year Two. Also contracted with Dr. Messner's research assistant, Hang Pham.
- Contracted with SelectTech Services, Inc. to ensure that qualified computer technicians were in the computer laboratories with teachers and students at all times for immediate resolution of any hardware or software problems or questions and to protect the integrity of the research.

- Scheduled and assisted Armstrong Laboratory personnel with proctoring pre- and post-tests required for research, and ensured transfer of research data.
- Submitted local status and technical reports and recommendations to Wright Laboratory regarding project accomplishments and future direction.

### **III. Ensure Site and Equipment Needs for Research Are Met**

- Supervised upgrading the computer equipment in both FST laboratories to accommodate student use of both R-WISE and WPS Tutors. Installed additional printers and 360 MB hard disk drives for servers at each school and installed modem at Dunbar to enable lab technician to communicate with Armstrong Laboratory technical support via e-mail. (The Trotwood-Madison lab has no access to a phone line. Therefore, the project has provided a mobile phone for that lab technician's use.)

### **IV. Effectively Administer All Grant Funds**

- Significant carryover funds at the end of Year Two thus requiring a smaller outlay by Wright Laboratory for Year Three.
  - ✓ Flexibility provided by contracting for technicians' time resulted in significant savings.
  - ✓ Costs to prepare school labs for Year Two were less than anticipated.
  - ✓ Armstrong Laboratory initiated fewer meetings than anticipated for various site representatives, resulting in lower travel costs.
  - ✓ Publication and reporting costs were lower than anticipated.

## SECTION 4.0: YEAR TWO TIMELINE

- |                    |   |
|--------------------|---|
| Summer,<br>1993    | <ul style="list-style-type: none"> <li>♦ <b>Local project upgraded equipment in the FST computer laboratories</b> at Dayton Dunbar and Trotwood-Madison High Schools to accommodate the focus for Year Two research.</li> <li>♦ <b>Project trained 8 Dunbar and Trotwood-Madison English teachers to use the Air Force's R-WISE Tutor</b> and incorporate its use into their classroom instruction.</li> </ul>  |
| Sept.,<br>1993     | <ul style="list-style-type: none"> <li>♦ <b>Twenty-three ninth grade English classes began using the FST computer labs</b> an average of one day a week.</li> <li>♦ <b>The project provided qualified computer technicians in the labs at all times</b> for teachers and students for immediate resolution of any hardware or software problems or questions.</li> </ul>  |
| Oct.,<br>1993      | <ul style="list-style-type: none"> <li>♦ In response to the Dayton project team's request for an additional year of research to more fully evaluate the effectiveness of the WPS Tutor, <b>the Air Force Armstrong Laboratory agreed to gather WPS data for a second year of research.</b></li> <li>♦ <b>Ten ninth grade, two-year Algebra I classes and 7 Trotwood-Madison "Workshop" classes (for students who had not yet passed the mathematics portion of the ninth grade Ohio Proficiency Test) began using the FST computer labs</b> an average of one day a week.</li> </ul>  |
| Dec.,<br>1993      | <ul style="list-style-type: none"> <li>♦ <b>Armstrong Laboratory personnel reported the following results of Year One research to Dayton and Trotwood-Madison school district, Alliance for Education and Wright Laboratory personnel, and other local project team members.</b> <ul style="list-style-type: none"> <li>• Students using the most advanced version of the WPS Tutor throughout the second semester improved more than (1) students using less advanced version and (2) those who remained in traditional classroom environment.</li> <li>• Students using the most advanced version of the WPS Tutor throughout the second semester scored significantly higher on concrete test items than those in the other two groups.</li> </ul> </li> </ul>   |
| March,<br>1994     | <ul style="list-style-type: none"> <li>♦ <b>Ohio Governor George Voinovich recognized the Dunbar FST lab as a key contributor to Dunbar's success on the Ohio Proficiency Test. Students demonstrated the R-WISE Tutor for the Governor during his visit.</b></li> </ul>  |
| April/<br>May 1994 | <ul style="list-style-type: none"> <li>♦ <b>Working in cooperation with Armstrong Laboratory, local evaluators, conducted a series of focus group sessions</b> with mathematics teachers, students, school site coordinators and lab technicians and concluded               <ul style="list-style-type: none"> <li>• FST computer lab time and training sessions increase teacher comfort level with computer-assisted learning technology.</li> <li>• Technical support and classroom assistance are critical for student and teacher success in the utilization of the FST software.</li> <li>• Teachers and students disagree as to the degree of match between the FST software and the classroom curriculum.</li> <li>• Access to technology was in itself motivational to the students.</li> </ul> </li> </ul> |
| Summer,<br>1994    | <ul style="list-style-type: none"> <li>♦ <b>Project trained Dunbar and Trotwood-Madison teachers in preparation for Year Three</b> involving data collection from both mathematics and English classes using software upgrades.</li> <li>♦ <b>Alliance for Education and Wright-Patterson Air Force Base renegotiated the FST grant to extend the project an additional fourth year.</b></li> </ul>   |

## **SECTION 5.0: YEAR TWO RESEARCH DESIGN**

### **5.1 Reading and Writing (R-WISE) Tutor**

#### **5.1.1 Description of the Tutor**

The R-WISE Tutor, primary focus for research during Year Two of the FST project, is designed to improve ninth grade English students' reading and writing skills by offering computerized tutoring specifically adapted to each student's performance level and interests. The Tutor guides the student to practice a logical sequence of steps, including reading, comprehension, pre-writing, drafting, revision and editing. Embedded in the Tutor are guides which enable students to seek help as needed for their individual concerns.

The philosophy of the R-WISE computer laboratory program involves a three-step process: (1) classroom preparation/teaching, (2) computer lab experience and (3) classroom follow-up/review.

#### **5.1.2 R-WISE Research Design**

The Year Two research involved four "treatment" and four "non-treatment" group English teachers and their classes at the local school sites. "Treatment" group teachers received specific lessons, developed by San Antonio teachers involved in developing the software, which utilized certain Tutor "tools." "Non-treatment" group teachers also took their classes to the computer lab; however, they developed their own lessons, using the tools in the software component entitled "WRITE."

At mid-year, a design change took place. Armstrong Laboratory personnel determined that the curriculum which classes in the "treatment" group used was less meaningful and pertinent for some groups of students, and some teachers had been struggling to try to cover all of the material in each lesson. At that time, Armstrong Laboratory encouraged the teachers to change the readings and content of the lessons, if needed, to better match the needs of their students, as long as the type of assignment (persuasion, definition, narration, etc.) and the set of R-WISE tools used by the students stayed constant.

TABLE 1: Local High School Treatment & Non-Treatment Groups Involved in Year Two Research

SCHOOL	SUBJECT	TUTOR	CLASSES	STUDENTS
Dunbar	Algebra I, Part I	WPS	6	180
Dunbar	English 9	R-WISE (Treatment)	9	250
Dunbar	English 9	WRITE (Non-Treatment)	4	111
<b>Sub-total</b>			<b>19</b>	<b>541</b>
Trotwood	Practical Algebra Workshop/Proficiency Test	WPS	4	101
			7	150
Trotwood	English 9	R-WISE (Treatment)	7	173
Trotwood	English 9	WRITE (Non-Treatment)	3	68
<b>Sub-total</b>			<b>21</b>	<b>492</b>
<b>TOTAL</b>			<b>40</b>	<b>1,033</b>

Note: Some of these students were in both ninth grade English and mathematics classes utilizing the computer labs; therefore, these individual students have been counted twice. Algebra I, Part I is the first section of a two-year Algebra course. Practical Algebra is a one-year, less in-depth Algebra course. Workshop classes are for students from grades 10-12 who have not passed the Ohio Proficiency Test and require additional intervention.

### 5.1.3 Armstrong Laboratory's Role in Evaluation

As the project's primary research team, Armstrong Laboratory administered a comprehensive reading test and attitudinal survey online plus collected paper-and-pencil writing samples from all test sites' ninth grade English students in September, 1993 and again in May, 1994.

Armstrong Laboratory contracted with outside evaluators to score the writing samples based on (1) *holistic* criteria which address the overall quality of the writing samples and (2) *analytic* criteria which address more specific skills, including abstraction, organization, purpose and development. They then planned to analyze those results and data collected from the reading tests and attitudinal surveys. Armstrong Laboratory agreed to disseminate their research findings to all test sites when completed.

## 5.2 Word Problem Solving (WPS) Tutor

### 5.2.1 Description of Tutor

The WPS Tutor, which was the primary focus for research during Year One of the project, is designed to teach ninth grade pre-Algebra students word problem solving skills as well as more general problem solving strategies with broader applications. Four cognitive activities are

employed in solving a problem and are represented as part of the WPS Tutor. In using the WPS Tutor, the student defines the problem, represents the problem, solves the problem, and reflects on the problem.

### **5.2.2 WPS Year Two Research Design**

*Decision for Second Year of Research:* Following Year One of the project, Wright Laboratory and the Alliance for Education staff agreed that preliminary Year One results were encouraging. However, the information was very general with little substantial support for the numbers. The Tutor was also changed several times during the year which meant that students did not use the final version long enough to ensure valid data. Therefore, the local team recommended that an additional year of research was needed to more fully evaluate the effectiveness of the software.

Armstrong Laboratory also wanted to gather data for a second complete year at both Dayton Dunbar and Trotwood-Madison High Schools, as well as a few other test sites, using the most current version of the WPS Tutor. That version contained more curriculum modules, than the earlier versions used by classes during the first year. Curriculum modules included Algebraic equations, area of quadrilaterals, area of triangles, area of circles, area of geometric shapes, circumference of circles, decimals, formulas, fractions, equations in Geometry, integer mathematics, number sequence, percentages, perimeter of triangles and quadrilaterals, proportions, Pythagorean Theorem, ratios, surface area, units of measure, and volume of geometric solids.

*Strategy:* Five teachers and their pre-Algebra and Algebra students at both local school sites plus students in Trotwood-Madison High's "Workshop" classes (for students in grades 10-12 who had not yet passed the mathematics portion of the ninth grade Ohio Proficiency Test, required for graduation) worked in the school labs an average of one day a week. By including "Workshop" classes, local school district administrators and project team members hoped to provide those students with an additional Proficiency Test intervention tool.

Version 4.04 of the WPS Tutor offered teachers the option of having students work in a "guided mode" (which forces students to follow each step in exact order and to identify all needed variables) or "unguided mode," (which gives students more freedom in identifying variables and setting up the problem). Each teacher was asked to select one of the two modes for each class and to continue using that mode with that class throughout the year. In response to teacher feedback, at the beginning of the second semester, Armstrong Laboratory modified the "guided" mode to allow students more flexibility in implementing the problem solving process.

### **5.2.3 Armstrong Laboratory's Role in Evaluation**

Again, as the primary research team, Armstrong Laboratory sought to answer the following questions as the result of a second year of research:

- ♦ Which group of mathematics students (those who used the "guided" or those who used the "unguided" version) improved the most?

- ♦ As a result of using the newer version of the WPS Tutor, did 1993-1994 students' scores improve more than the 1993-1994 students who used several versions throughout the school year?

Armstrong Laboratory had not yet published the results of their research at the time of the publication of this report.

### **5.3 Local Qualitative Research Project**

In cooperation with Armstrong Laboratory, the local research team conducted a local qualitative research project during Year Two. The purpose of the research activity was to broaden their understanding of the skills, training, and attitudes which can be used to make the application of computer-aided instruction a success.

A summary of the local research team's report, entitled *Summary of: Final Report: Qualitative FST Research in Two Ohio School Districts* is attached to this report as Appendix A.



## SECTION 6.0: YEAR THREE (1994-1995)

### 6.1 Maintenance Year

Since the Life Science Tutor, scheduled for field-testing in local schools during the 1994-1995 academic year, will not be ready until the 1995-1996 school year, Armstrong Laboratory proposed that they continue to collect data for both English and mathematics classes using the R-WISE and WPS Tutor software. Wright Laboratory approved the local team's recommendation to adopt that strategy. The local team defined the third year as a maintenance year in which:

- There would be no major equipment purchases since only upgrades of current software would be installed.
- The local project would continue to fund full-time technical support throughout the year in order to ensure that the computer laboratories will be operational for Year Four research.
- School districts would determine which English and mathematics classes would use the computer laboratories, taking into consideration Armstrong Laboratory's request for English classes to be top priority.

### 6.2 Year Three Research Design

**R-WISE Tutor:** There are no "non-treatment" group classes using the computer laboratories this year. However, in response to Year Two feedback from teachers indicating that some components were too complicated for their students, Armstrong Laboratory developed two versions of the R-WISE Tutor:

- A "lean version" which is directed to students with lower reading levels. It provides *unsolicited* advice and includes illustrated examples or models.
- A "rich version" which is somewhat more complicated and is geared toward the higher level students. It provides *solicited* advice, which students may choose to request in the form of (1) diagnosing a specific problem and selecting a way to repair it, (2) a mini-lesson on a specific writing skill or (3) recommended specific action.

English teachers have been asked to use both versions, utilizing the "lean version" with all classes first semester and then switching half the classes to the "richer version" during second semester.

In order to enable the teachers to better incorporate visits to the FST labs with their own curriculum during Year Three, Armstrong Laboratory encouraged all teachers to select the readings and content of the lessons to match the needs of their own students.

**WPS Tutor:** Practical Algebra and Workshop classes continue to use the FST computer laboratories at both schools. In response to teacher feedback during Year Two of the research,

the mathematics teachers now may assign the "guided" and "unguided" modes to students according to individual needs rather than assigning a whole class to the same mode for the entire year.

**Preliminary Feedback:** Early reports indicate that both the English and mathematics teachers are very enthusiastic about the flexibility they have this year to incorporate FST lab activities into their curriculum. Teachers also report that they are much more confident as they take their students into the labs and, as the schedule allows, some teachers are taking additional classes, such as Creative Writing and tenth grade English classes, to the labs.

## **SECTION 7.0: NEXT STEPS**

During the past two years, local project team members have relied on the project's originator, the Air Force Armstrong Laboratory, for research design and implementation. Thus, local research focused primarily on qualitative research to support Armstrong Laboratory efforts.

Through regular communication with project stakeholders and observation in the labs, Alliance for Education staff and local team members endeavored to ensure that the research design for this project was effective. As a result, the local team has continued to assist Armstrong Laboratory personnel in making some "mid-stream adjustments."

In addition to the research questions being addressed by Armstrong Laboratory, the local project team would like to insure that some local research questions are also addressed.

### **THEREFORE:**

1. During Year Three the local research team will study whether there is, in fact, any correlation between students' work on the Tutors and results on the Ohio Proficiency Test. They will focus on
  - Determining commonalties between the WPS Tutor "modules" and the Proficiency Test learning outcomes.
  - Based on those commonalties, comparing Proficiency Test scores of students who have used the FST labs with students who have not used the labs. (Strategies will include determining how successful students in Trotwood-Madison's "Workshop" classes were following this intervention compared to others.)
2. Based on the results of the study described above, local evaluators will be better equipped to address the question of whether student behaviors learned through use of the WPS and R-WISE Tutors transfer to the classroom and beyond (near and far effect).
3. Local project resources will include Dayton and Trotwood-Madison personnel, local universities, Armstrong Laboratory and the Ohio Department of Education.
4. The local research team will also assist local districts to identify other elements they want analyzed.
5. The Alliance for Education will continue to endeavor to work with Armstrong Laboratory to obtain and disseminate information needed to address questions and unresolved issues.

## SECTION 8.0: ADDITIONAL ACTIVITIES

Teachers are among the most isolated professionals in the United States. They work alone, often behind closed doors. They rarely interact with one another--especially at the secondary level--and most do not know--let alone use--the potential support systems in their own districts and communities. Therefore, teachers have little if any understanding of the "real world" applications of what they teach. In addition, teachers teach as they were taught with limited recognition, even among the strongest, that they cannot really "teach" as long as they see themselves as repositories of knowledge rather than facilitators of learning. This situation has contributed greatly to the crisis in mathematics and science education. Further, the new and ever-expanding knowledge bases in these fields mean that teachers who stay behind closed doors have almost no hope of stimulating the thinking and understanding in their students that this country needs in the next century. Teachers need to experience the applications of the subjects they teach. And, they need to work with practicing scientists, mathematicians and engineers as teammates in changing the educational environment.

The Alliance for Education's Project GEMMA (Growth in Education through a Mathematical/Scientific Mentorship Alliance) provides teachers with an opportunity to experience mathematics and science through an intensive eight-week, on-site, summer internship experience. The goals of the Project GEMMA program are (1) to improve teacher and, therefore, student understanding of the "real world" and its applications of mathematics and science and (2) to influence teaching methods and student understanding and enthusiasm for mathematics and science.

Wright Laboratory Materials Directorate has been an active participant of Project GEMMA since its pilot year in 1990. In 1994, funding for participation of 12 teachers at Wright Laboratory was made possible through FST grant funds. See Appendix D for additional information about Project GEMMA.

**Summary of:**

**FINAL REPORT:  
Qualitative FST Research in Two Ohio School Districts**

Submitted to:  
Alliance for Education

August 22, 1994

Submitted by:

Katie E. G. Thorp, Associate Research Engineer  
University of Dayton Research Institute;

Hang T. Pham, Research Assistant  
Wright State University;

Phillip E. Messner, Professor  
Wright State University

## ABSTRACT

In cooperation with the Alliance for Education, qualitative research consultants from Wright State University and the University of Dayton Research Institute conducted a pilot qualitative research project at two Fundamental Skills Training (FST) sites in Dayton, Ohio and Trotwood, Ohio during the 1993-1994 academic year. The purpose of this research activity was to broaden our understanding of the skills, training, and attitudes which can be used to make the application of computer aided instruction a success. Success was defined by the testimonials and stated personal beliefs of the teachers and students involved in the project.

The focus group inquiry method was utilized for this research activity. Focus group inquiry is a specific group discussion format which involves a skilled facilitator, a group of people with shared interests or information, and a process for recording the discussion for future analysis.

Four specific topic areas were addressed in the study. These general areas involved the use of the FST software in the computer lab and how that experience related to (1) teacher and student comfort level with computer technology in the classroom, (2) types and quantities of technical support needed in the FST computer laboratory, (3) the relationship between the FST software and classroom curriculum, and (4) student motivation in the FST laboratory.

A variety of open-ended questions were developed to address each of these topic areas. An attempt was made to maintain the discussion in these areas during each session. The focus group sessions were videotaped, audio taped, and notes were taken.

A wealth of information was obtained from the study. The following conclusions are generalization of some of those findings; (1) FST computer laboratory time and training sessions increase teacher comfort level with computer assisted learning technology, (2) technical support and classroom assistance are critical for student and teacher success in the utilization of the FST software, (3) teachers and students disagree as to the degree of match between the FST software and the classroom curriculum, and (4) access to technology was in itself motivational to the students.

## **SUMMARY**

The teachers stressed many times that a significant amount of hands-on practice at the computer terminal is required to gain proficiency and confidence with the FST software.

Some frustration and discomfort was expressed by the students and may be a result of problems with the software, lack of knowledge on subject matter covered by the software, and/or inadequate assistance in the computer lab for when questions or problems arise.

FST teachers expressed a desire for additional computer laboratory time to adapt/correlate classroom curriculum with the FST software and visa versa.

Most teachers and students were not keyboard proficient and did not believe that proficiency was important for FST success.

There was consensus between the teachers and students that additional technical and/or teacher/aid support would be very beneficial in the laboratory.

Several of the teachers have allowed students to help each other in the computer laboratory. In those instances, both the teachers and the students reported a favorable result. This relieved the teacher of much of the pressure of getting to each of the students who was having a problem and it allowed the students to get immediate assistance.

Teachers and students disagreed about the integration of the software with the school curriculum. The teachers were generally supportive of the notion that the school curriculum matched and/or was integrated well with the laboratory environment. Many of the students did not see a relationship between the computer laboratory sessions and regular classroom activities.

The teachers (especially the Dunbar teachers) viewed the FST software as an excellent review tool for use while preparing for mandated testing.

There was some disagreement between the students and the teachers as to whether the FST software assisted the students on the Ohio State Proficiency Test.

Students and teachers testified to the fact that the FST computer laboratory had a positive effect on student attitude, motivation and discipline.

Increased motivation of students is a significant outcome of this project.

## TABLE OF CONTENTS

	Page Number
Introduction . . . . .	20
Purpose . . . . .	20
Research Methodology . . . . .	21
Data Analysis . . . . .	22
Findings of Study . . . . .	23
Conclusions . . . . .	27
Recommendations . . . . .	27
Appendices	
Appendix A: References . . . . .	29
Appendix B: Information on <i>QualPro</i> Computer software . . . . .	30-32
Appendix C: Focus Group Interview Transcripts	
Laboratory Technicians and Site Coordinators . . . . .	33-54
Dunbar Teachers . . . . .	55-68
Trotwood Teachers . . . . .	69-86
Trotwood Students . . . . .	87-101
Dunbar Students . . . . .	102-116
Appendix D: <i>QualPro</i> Code Frequencies . . . . .	117-119



## **INTRODUCTION**

In cooperation with the Alliance for Education, qualitative research consultants from Wright State University and the University of Dayton Research Institute conducted a pilot qualitative research project at two Fundamental Skills Training (FST) sites in Dayton, Ohio and Trotwood, Ohio during the 1993-1994 academic year. This study was undertaken because of a scarcity of information available about classroom behaviors and external influences on the FST learning process.

The Alliance for Education and Wright-Patterson Air Force Base, both in Dayton, Ohio, have cooperated with Armstrong Laboratory at Brooks Air Force Base in San Antonio, Texas in the field testing and validation of an application of Air Force developed artificial intelligence technology known as Fundamental Skills Training (FST). The FST project focuses on student intervention through computer assisted instruction to improve algebra word problem solving, reading, writing, and science skills. The Word Problem Solving (WPS) version and Reading and Writing in a Supportive Environment (R-WISE) version of the software are currently being field tested in the Dayton-area. Ninth graders from Dayton Dunbar High School and Trotwood-Madison High School are currently using the software as part of their course curriculum.

## **PURPOSE**

The purpose of this research activity was to broaden our understanding of the skills, training, and attitudes which can be used to make the application of computer aided instruction a success. Success was defined by the testimonials and stated personal beliefs of the teachers and students involved in the project. The following research questions were developed to guide the collection and analysis of data:

1. What teacher skills, abilities, and attitudes contribute to computer-assisted teaching success?
2. What student skills, abilities, and attitudes contribute to computer-assisted learning success?

Four specific topic areas were developed to aid in gathering information to address these questions. They were:

1. Computer comfort before and after involvement in the project.
2. Administrative and technical support needed.
3. Integration of computer aided instruction with classroom curriculum.
4. Student attitude and motivation.

Each of these topics was addressed by groups of students and teachers familiar with the software and their ideas and comments were recorded. This information could then be used to develop an understanding of the support structure needed for, and results of, successful implementation of computer aided instruction.

## **RESEARCH METHODOLOGY**

### **Focus Group Inquiry**

The case study strategy was used to gather in-depth information about Dayton and Trotwood students and teachers participating in the FST software project. Patton in his book, Qualitative Evaluation Methods, states, "The more a program aims at individualized outcomes, the greater the appropriateness of case study methods." In that this project was directed at individual outcomes, the case study approach was, therefore, an appropriate model to use.

Focus group inquiry is a specific group discussion format which involves a skilled facilitator, a group of people with shared interests or information, and a process for recording the discussion for future analysis. The facilitator must be skilled at maintaining a free-flowing and relaxed atmosphere, monitoring individuals in the group to ensure that all members get a chance to voice their opinions, guiding the conversation in order to maintain a specific, pre-defined discussion topic, and not influencing the discussion by voicing personal agreement or disagreement with specific responses from the group.

The atmosphere at the focus groups sessions should be as relaxed and conducive to personal sharing as possible. Care must be taken during these sessions to ensure that the discussion does not become a brainstorming session, but remains on task on the pre-defined discussion topics. A variety of group dynamics techniques can be used by the facilitator to passively lead the discussion. Particularly boisterous or opinionated participants should be seated near the facilitator to minimize eye contact between the facilitator and this particular individual. This will decrease their tendency to dominate the discussion. Likewise, particularly quiet or shy participants should be seated directly across from the facilitator to maximize eye contact and thereby increase the likelihood of the shy person contributing to the conversation. Other techniques involve such tactics as long silent pauses with eye contact following a comment by a participant. This will stimulate the participant to elaborate on their previous comment. Subtle, or not so subtle, body language techniques can also be used to encourage a particular participant to get to the point or to finish a speech.

A significant amount of thought must be given to the reason for the focus group sessions prior to their initiation. Topics of discussion should be well defined and participants carefully considered to insure that a significant amount of useful information will be obtained from the sessions.

### **Development of Discussion Questions and Format**

Initially the research team members consulted with the Alliance for Education and researchers at Armstrong Laboratory to aid in the development of a list of questions and topic items to be discussed in the focus group sessions. The research team members then brainstormed additional ideas. All of the ideas were then grouped and classified into four basic topic areas. These general areas involved the use of the FST software in the computer lab and how that experience related to (1) teacher and student comfort level with computer technology in the classroom, (2) types and quantities of technical support needed in the FST computer laboratory, (3) the relationship between the FST software and classroom curriculum, and (4) student motivation in the FST laboratory.

A variety of open-ended questions were developed to address each of these topic areas. An attempt was made to maintain the discussion in these areas during each session. The focus group sessions were videotaped, audio taped, and notes were taken. Typed transcripts were then prepared for each session.

## **Focus Group Membership**

Participants for the focus group sessions were selected based on their familiarity with the algebra word problem solving version (WPS) of the FST software. Several of the participating teachers, students, and technicians were also familiar with the reading and writing version (R-WISE) of the software. Discussion items were designed to focus on the WPS version; however, many of the participants gave responses which were clearly directed at the R-WISE version of the software. Where appropriate, these differences were noted. However, all data presented should be evaluated based on the premise that it could apply to either or both of the software packages in use at the schools.

Membership in focus groups consisted of all available teachers who had used the WPS software during its first year of placement in the schools, current site coordinators and computer lab technicians, and representative students who had used the WPS software during its second year in the schools (the current year).

The following groups were assembled to collect data through the focus group method:

*Focus Group 1* - This group consisted of Dayton and Trotwood supervisory and support personnel. Site coordinators (n = 2) and project technicians (n = 2) responded to a prepared list of questions. One of the site coordinators was an English teacher who had used the R-WISE software. Many of her responses referred exclusively to that version of the software. Both technicians assisted in classes of R-WISE as well as WPS. Their responses related to either version of the software. The FST computer lab technicians were able to supply interesting perceptions about teacher teaching styles and the relationship between teaching style and student success. However, it is important to remember that these technicians are not trained education experts and their opinions regarding teacher and student success are based solely on personal perception.

*Focus Group 2* - This group consisted of Dayton and Trotwood WPS teaching personnel (n=8). Dayton teachers and Trotwood teachers were interviewed in two separate focus group sessions.

*Focus Group 3* - This group consisted of Dayton and Trotwood WPS students (n=10). Dayton students and Trotwood students were interviewed in two separate focus group sessions. Some of the students had used the R-WISE software as well as the WPS software and responses from this group were often referring to R-WISE as well as WPS.

The research team complied with all ethical standards developed and supported by the American Educational Research Association and the American Psychological

## **DATA ANALYSIS**

A substantial amount of information was obtained during the focus group sessions. The raw transcripts of each of these sessions is included in the Appendices of this report. The research team used qualitative analysis methodology to summarize and interpret the focus group interview data.

The research team selected *QualPro*, a PC/DOS software program, to aid in analysis of the data (See Appendix B). This software was purchased by the Alliance for

Education for this purpose. *QualPro* was developed to conduct qualitative analysis from extensive databases similar to the type generated in this study.

The data was processed through a series of iterative consolidations. The raw data consisted of typed verbatim transcriptions of each of the focus group sessions (see Appendix C). Initially the raw data were coded for topic area. Summarization of the data was accomplished by constructing codes that corresponded to common discussion themes. Each sentence in the transcription was then grouped according to topic area and assigned a summary code. *QualPro* was then applied and frequency of occurrence was observed (Appendix D). This allowed for identification of the number of times that a specific topic area was addressed. The codes were later consolidated due to the incredibly large amount of information and the need to minimize the number of variables to allow accurate assessment of both the data and the intention of the project participants who provided the data. Often during the discussions, different phrasing would be used to address the same issue. The consolidation process allowed for grouping of these situations under the particular topic area being discussed. The data were then ready for interpretation.

The research team made several observations about the application of the focus group inquiry method in this type of research.

1. The PC-based computer program used to aid in analysis of this data, *QualPro*, allowed for quantification of the focus group data. The process, however, was very time consuming.
2. The research team recognizes that an *a priori* assignment of codes to the data would better prepare the team during the collection and analysis of the data. By assigning codes *post hoc*, the team found that the initially developed codes were too specific and the team then had to combine codes to reduce the volume of data generated by the *QualPro* software into a usable format. Whereas this process was time consuming, the team suggests that this multiple step process contributed to the overall interpretation and understanding of the findings and is, therefore, important. The thought processes involved in coding the data forced the researchers to reconsider what the intention of the coding and the intention of the speaker was. This process proved enlightening and often altered the first impression interpretation of a given statement made by one of the discussion group participants.
3. This study utilized three methods of data collection during the focus group session; (1) note taking, (2) videotaping, and (3) audio taping. The team found that the note taking was the least utilized. In the interest of saving space and paper, the notes are not included in this report. They are, however, available from any of the research team members. The transcribed notes from the video and audio taped proved the most useful. At least two data collection sources should be used for accurate transcription and to reduce loss of data.

## FINDINGS OF STUDY

A wealth of information can be obtained by studying both the raw discussion transcripts and the frequency of occurrence of specific topics in the summary sheets obtained through *QualPro*. The research team members recommend that interested parties read through each of these appendices to form their own ideas and opinions. However, care should be taken during any such analysis to insure that personal biases and

prior opinions do not influence the interpretation of information contained in these transcripts.

The breadth of the information obtained during this study makes summarization of the data difficult and in many respects limiting. The authors of this report have, nonetheless, attempted to summarize the major findings of the study and these are presented below.

### Topic 1: *Comfort with Computer Technology*

The majority of the teachers involved in this program had some prior experience with computers. This experience was, however, limited. Virtually all of the teachers expressed a significant lack of comfort with the computers and the software at the beginning of the program. This discomfort was expressed both in relation to personal use and to use of the software and computers in the computer lab environment.

All of the teachers reported increased comfort with computer technology and the FST software after the training in San Antonio, personal practice, and, especially, after use in the classroom. The teachers stressed many times that a significant amount of hands-on practice at the computer terminal is required to gain proficiency and confidence with the FST software. Most of the teachers still lack proficiency and confidence with the computer hardware. The majority of the teachers do not wish to become proficient with the computer hardware. They would much prefer to have an 'expert' available to assist them and to resolve problems that arise.

The administrative/support personnel and teachers stated that they gained comfort with computer technology through the use of the FST software. However, the students were fairly ambivalent about their personal comfort level. Most of the students were fairly familiar with computers and did not view the use of the FST software and computer hardware as significantly different. Some frustration and discomfort was expressed by the students and may be a result of problems with the software, lack of knowledge on subject matter covered by the software, and/or inadequate assistance in the computer lab for when questions or problems arise.

FST teachers expressed a desire for additional computer laboratory time to adapt/correlate classroom curriculum with the FST software and visa versa. They also expressed a desire for additional time to gain experience with the FST system and specific problems which it includes. This was deemed critical for the integration of classroom curriculum and the FST curriculum. Often during a laboratory experience a teacher is asked to assist a student with a problem that the teacher is not familiar with. This causes difficulty and delays for the teacher. Paper copies of all problems were given to the teachers this year and this alleviated this difficulty for those teachers who had time to review these problems before going into the lab.

Most teachers and students were not keyboard proficient and did not believe that proficiency was important for FST success. Particularly during use of the WPS tutor, very little typing is required. Proper mouse skills are more important than typing skills.

The teachers stated that the software training in San Antonio was beneficial. However, the time lag between the training and classroom utilization was too long and negated much of the training. Many of the teachers had forgotten much of what they had learned in San Antonio by the time that they were able to go into their own lab and begin using the software. This problem was primarily an isolated situation which occurred during the first year of analysis because of a delay in installation of the computer equipment. This situation has since been rectified and this problem should not occur in the future.

## Topic 2: *Administrative and Technical Support Required*

There was consensus between the teachers and students that additional technical and/or teacher/aid support would be very beneficial in the laboratory. Teachers and students testify to the fact that students often become very frustrated while using the tutor. This is usually a result of problems with the software or a lack of knowledge about the subject matter. Because each student is working on a different problem, the teacher must respond to each student individually. This often leads to some students having to wait for extended periods of time while the teacher is working with another student. Additional aids or students in the classroom would alleviate this problem.

Although this is a significant problem with the program, the teachers say that in a similar situation in the classroom, the entire class is held-up while the teacher assists one problem student. In the computer lab, the majority of the students are able to progress at their own speed while the teacher assists those students who require additional help.

Several of the teachers have allowed students to help each other in the computer laboratory. In those instances, both the teachers and the students reported a favorable result. This relieved the teacher of much of the pressure of getting to each of the students who was having a problem and it allowed the students to get immediate assistance. Several of the teachers were apprehensive about allowing the students to help each other for fear that they would not remain on task, would disrupt other students, or would "give away the answers."

Ideas such as student aids assigned to help in the classroom, peer interaction, parent volunteers, and paid classroom assistants were all discussed. Peer interaction between the students would be the most economical and easily implemented of these options. For the optimum success of this option the teachers should be given proper training to insure that their concerns are addressed and that they are aware of techniques which can be used to make this type of classroom learning most effective. This matter should be addressed further to insure that the computer laboratory is being utilized to the fullest extent possible.

Guided instruction with hard copy manuals was deemed important and necessary by some teachers and students. Other teachers and students admitted that they would not take the time to use such material if it were provided. The materials should be made (and currently are) available for those teachers and students who feel that it would be helpful.

Most of the teachers felt that additional school district support in the form of additional planning time and/or release time would be helpful for successful implementation of the FST program. Additional time would allow for more thorough planning and implementation of the software.

## Topic 3: *Integration with School Curriculum*

Teachers and students disagreed about the integration of the software with the school curriculum. The teachers were generally supportive of the notion that the school curriculum matched and/or was integrated well with the laboratory environment. Many of the students did not see a relationship between the computer laboratory sessions and regular classroom activities. Several students, however, felt that their particular teacher had correlated the activities well. The student perceptions may be an indication of some teachers having spent more time working to integrate the two activities, or it may simply be a matter of communication of goals between the teachers and the students. This matter should be addressed further to insure that the computer laboratory is being utilized to the fullest extent possible.

The teachers (especially the Dunbar teachers) viewed the FST software as an excellent review tool for use while preparing for mandated testing. The teachers generally felt that the instructional modules and word problems were a wonderful review

tool to address material which had previously been covered in the classroom. Many teachers felt that this was the way in which the software could be most effectively used. There was some disagreement between the students and the teachers as to whether the FST software assisted the students on the Ohio State Proficiency Test. Some of the teachers felt that the FST software matched the proficiency test in design and/or material. However, some felt that the two were unrelated. Likewise, the students were divided about the relationship between the two activities. Due to the strong emphasis in these school on helping students to master the material on this test, this issue should be investigated further.

#### Topic 4: *Student Attitude and Motivation*

Students and teachers testified to the fact that the FST computer laboratory had a positive effect on student attitude, motivation and discipline. In some cases these changes were transferred to the classroom as well. This points to one of the major strengths of this project and is also an area which deserves further study. The change in attitude may or may not be related to the FST software itself. Both the students and teachers stated that the atmosphere of the room played some part in motivating the students. Aesthetic room conditions such as air conditioning, carpeting, subdued lighting, and comfortable chairs may all have contributed to this effect. However, regardless of the cause, increased motivation of students is a significant outcome of this project.

It is interesting to note that the Trotwood teachers were less adamant than the Dunbar teachers about the motivational effects of the tutor. When the topic was addressed by the facilitator, the teachers primarily discussed student enjoyment of going into the lab and not motivational or disciplinary changes. The Dunbar teachers, however, were convinced that the software and/or computer lab experience was motivational to the students. This difference in teacher focus and perception may be an indication of the differences in environment and student population between the two sites. However, individual teacher personality, style, and goals may also have caused the discussions between the two groups of teachers to vary somewhat on this point.

During their respective focus group sessions, the Trotwood students were more controlled and responded in a more orderly manner than the Dunbar students. These differences may suggest that the Dunbar teachers are required to place a greater personal emphasis on motivating and engaging their students than the Trotwood teachers are. These differences should be considered when comparing perceptions and test scores between the two groups. It should also be kept in mind, however, that the discussion group sessions only provide a limited glimpse of the environment that any of these teachers face on a daily basis.

Students from both schools were often frustrated due to lack of skill with the FST software and/or the subject matter. Their lack of skill forced them to wait for assistance from the teacher or technician. This waiting process, while their classmates worked on, caused frustration which appeared to be directed primarily toward the computer. The teachers also commented on the level of frustration experienced by many of students. These problems could be minimized through additional classroom assistance or peer-teaching as addressed earlier.

Both teachers and students said that the computer lab did not appear to effect student attendance. However, the teachers did say that students were often disappointed to learn that they had missed a lab experience.

Both Dunbar and Trotwood teachers had a positive attitude about the affective importance of the FST program. The Dunbar teachers, however, were decidedly more adamant about the positive impact that the system has had and appeared to have higher expectations about the effective outcomes for their students using the software.

## **CONCLUSIONS**

The following conclusions are offered and appear to be justified by the findings of this study:

- A. FST computer laboratory time and training sessions increase teacher comfort level with computer assisted learning technology.
- B. Technical support and classroom assistance are critical for student and teacher success in the utilization of the FST software.
- C. Teachers and students disagree as to the degree of match between the FST software and the classroom curriculum.
- D. Access to technology was in itself motivational to the students.

## **RECOMMENDATIONS**

### **Optimum Use of FST Software**

The research team has found computer laboratory technical support to be a critical component of this project. The availability of teachers, technicians, aids, and/or other students to help students who run into difficulty on the program has great potential to influence both student and teacher perceptions about the effectiveness of the software and the computer laboratory experience. It was noted that the present configuration and staffing of the computer laboratories is sufficient, but not optimized, to meet the needs of the students and the teachers. Computer assisted instruction in many ways requires one-on-one individual student attention, as in any tutoring environment. Students using the FST software require the occasional assistance of a teacher or knowledgeable aid to address difficulties which arise. The current group instructional model utilized by many of the teachers in the FST program creates a great deal of student frustration which translates into dissatisfaction with computer technology. It is apparent that school districts cannot afford to employ additional adult support for the FST laboratories. Therefore, the research team recommends that cooperative learning strategies be investigated to increase peer support within the laboratory environment.

### **Future Research**

The research team recommends continued research in a variety of areas. Further study and assistance for the teachers in the area of cooperative teaching techniques could prove to greatly increase the effectiveness of the software packages and computer aided instruction in general. Coordination of the computer lab activities with material being covered in the classroom should also be addressed. Observation of classroom situations and teacher styles should be included in any study concerning either cooperative learning or curriculum coordination.

Teacher and student recognized improvement in student attitude and motivation is a very significant finding of this program. The relationships between the environment, software, technology, and student behavior deserve further study.

Due to the strong focus in the schools on increasing scores on the Ohio Proficiency Test, the correlation of the computer lab activities with tests scores should be



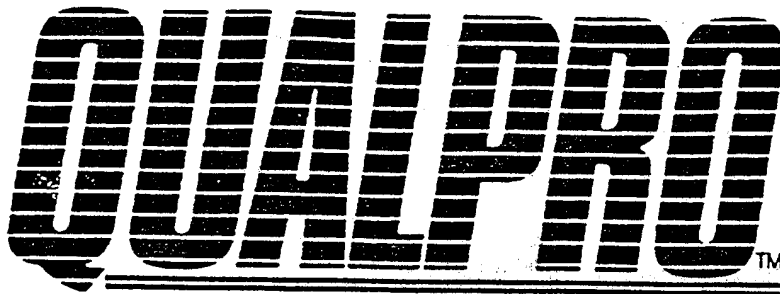
addressed. This topic is of grave interest to the schools and deserves some study by the research team.

### **Focus Group Research**

Focused inquiry methodology has the potential to identify new and novel topics and issues about educational settings and outcomes. Therefore, we recommend that the Alliance for Education and Armstrong Laboratory consider the use of these qualitative tools in conjunction with quantitative research methodologies.

## REFERENCES

- Brodigan, David L. (1992). Focus Group Interviews: Application for Institutional Research. The Association for Institutional Research, 43, 1-6. ED 342 325.
- Buttram, Joan L. (1990). *Focus Groups: A Starting Point for Needs Assessment..* Paper presented at the Annual Meeting of the American Educational Research Association (Boston, MA, April 16-20, 1990). ED 322 628.
- Capps, Randall. (1991). *Focus Groups as a Method for Conducting a Needs Analysis: A Case Study for an Employee Attitude Survey.* Paper presented at the Annual Meeting of the Southern Speech Communication Association (Tampa, FL, April 3-7, 1991). ED 336 777.
- Fern, Edward F. (1982). *The Use of focus Groups for Idea Generation: The Effects of Group Size, Acquaintanceship, and Moderator on Response Quantity and Quality.* Journal of Marketing Research, 14, 1-13.
- Greenbaum, Thomas L. (1988). The Practical Handbook and Guide to Focus Group Research. Lexington, MA: D.C. Heath and Company.
- Higginbotham, James B. and Cox, Keith K. (1979). Focus Group Interviews: A Reader. Chicago, IL: American Marketing Association.
- Katz, Elinor. (1993). *A Critical Analysis of Interview, Telephone, and Mail Survey Designs.* Paper presented at the Annual Meeting of the American Educational Research association (Atlanta, GA, April 12-16, 1993).
- Krueger, Richard A. (1988). Focus Groups: A Practical Guide for Applied Research. Newbury, Park, CA: SAGE Publications, Inc.
- Merton, Robert K. (1987). The Focussed Interview and Focus Groups: Continuities and Discontinuities. Public Opinion Quarterly, 51, 550-566.
- Morgan, David L. (1988). Focus Groups As Qualitative Research. Newbury Park, CA: SAGE Publications, Inc.
- Morgan, David L. and Spanish, Margaret T. (1984). Focus Groups: A New Tool for Qualitative Research. Qualitative Sociology, 7(3), 253-270.
- Rahilly, Tony. (1992). *Using Marketing Research Techniques To Improve Quality and Service.* Durham College of Applied Arts and Technology, Oshawa, Ontario. ED 352 102.
- Reynolds, Fred D. and Johnson, Deborah K. (1978). Validity of Focus-Group Findings. Journal of Advertising Research, 18(3), 21-24.
- Ward, Victoria M., Bertrand, Jane T. and Brown, Lisanne F. (1991). The Comparability of Focus Group and Survey Results. Evaluation Review, 15(2), 266-283.
- Teles, Lucio and Duxbury, Nancy. (1991). *The Networked Classroom: An Assessment of the Southern Interior Telecommunications Project (SITP). Phase 1: August 1990-August 1991. Final Report: September 1991.* Simon Fraser University, Burnaby, British Columbia. ED 348 988.



TEXT DATABASE and  
PRODUCTIVITY TOOL

Impulse Development Co.

### What is Qualpro?

**QUALPRO** is a menu-driven and user-friendly text database manager and productivity tool. When using **QUALPRO** as a text-database manager, you can structure, label, and group text documents. Once text documents are entered and organized, it is easy to search the database and retrieve a document. When you use the main **QUALPRO** program you can electronically attach codes (or keys) to sections of text within documents. The coded sections can then be located, copied, labeled, and directed to the screen, a printer or textfile. Each extracted section of text is printed with information identifying the document and its location within the document.

In addition to the main program, **QUALPRO** has a collection of Productivity Tools that allow you to present and analyze text data in several ways. Frequencies, Cross-Tabulations and Inter-Coder Reliabilities, not normally associated with textual analysis are easily and painlessly produced.

When you use **QUALPRO** you can electronically attach codes (or key words) to sections of text within documents. The coded sections can be located, copied, labeled, and directed to the screen, a printer or file. Each extracted section of text is printed with information identifying the document and its location within the document. The collection of extracted segments of text collected into one file or print out, permits the researcher new analytic perspectives of the data.

When you use the **QUALPRO** Productivity Tools you can subdivide the database into sub-groups, locate, copy, and label all uncoded text, and summarize the codes and frequencies in selected files or in all the files. You can also produce Cross-Tabulations of codes by files, and compute the Inter-Coder Reliability for two coders.

### Who Should Use This Program?

**QUALPRO** was written to facilitate the clerical and administrative tasks in qualitative research and therefore appeals to a broad range of researchers and writers. Because content analysis, ethnography, participant observation, historical critical analysis and many other forms of field research depend on large amounts of text data, **QUALPRO** is a valuable research assistant in these approaches.

Anthropologists, psychologists, sociologists, journalists, and writers who collect and manage large amounts of qualitative data will find **QUALPRO** an indispensable tool in the data management and interpretation process. Evaluation researchers in education and other fields of practice will find **QUALPRO** a valuable tool as well.

Management and organization researchers will find **QUALPRO** a useful means of organizing and managing qualitative data. Managers of internal information in a business or organization will find **QUALPRO** a valuable ally in organizing and managing correspondence, reports and research.

In fact, anyone who uses large amounts of disk-based text can enhance productivity in writing and organizing writing with **QUALPRO**.

### How Does Qualpro Differ From Text or Relational Databases?

At first glance it may appear that a high-powered relational or text database could do what **QUALPRO** does. That is not entirely true. First, traditional databases usually require prior and fixed-field designation before information can be retrieved. For example, name and address field types and sizes are determined before data entry, which then restricts the amount and type of data entry and type of output.

Second, since many high powered database systems, like DBASE IV, are technically programming languages it may be possible for an expert programmer to approximate what *QUALPRO* does in DBASE IV. But, since databases programs like DBASE IV are not specialized for text, it is impractical for the user to try to reproduce what *QUALPRO* does in a relational database.

Text databases also may appear to do what *QUALPRO* does. However, text databases are usually specialized for organizing and then quickly finding a file based on a word or combination of words contained in that file. Like relational databases, text databases have not been created specifically for the tasks a qualitative researcher requires. *QUALPRO* has been designed by a qualitative researcher for qualitative researchers. The right tool for the right job.

*QUALPRO* was designed as a simple and flexible text database manager. As a text database manager, *QUALPRO* organizes and retrieves whole documents without requiring field designation prior to data entry. Also, *QUALPRO* does not set prior limits on the size of text documents. Therefore, retrieval of data is not limited to predetermined sort categories or keys.

Codes (or keys) can be electronically attached to a text document without altering the document. Any section of a document, down to a single line of text, can be located, extracted and reproduced. *QUALPRO* can electronically attach any number of different codes any number of times to any number of documents in a database. Codes and code frequencies can be compiled from a single document or from the entire database of documents. Code by file cross-tabulations provides a further way to observe the data. And the performance of coders can be compared to assess the consistency at which the codes have been applied to the text.

Therefore, *QUALPRO*'s unique advantage over the traditional databases is its flexibility in retrieving information from text in a manner that mirrors and supports the iterative process involved in the creative and interpretive processing of qualitative data. Furthermore, *QUALPRO* provides different ways of looking at the text data that help to structure and defend qualitative results without interfering with the central interpretive process in textual analysis.

Overall, *QUALPRO* reduces the labor-intensive clerical aspects of managing data and permits reexamination, exploration, and interpretation without burdening the user with clerical baggage while extending the opportunities for analysis and data presentation.

### How is the *QUALPRO* Output Presented and Used?

Information from a single document file, from multiple documents or from the entire database of documents can be directed to the screen, to the printer, or to a textfile. Output can include HEADINGS, information identifying the document; FILES, the text document; CODES, sections of text extracted from the whole text document by key words; CODES SUMMARIES, information on code names; and CODE FREQUENCIES, information on the number of times a code appears.

For example, one codename can be selected and collected for the entire database. This means every occurrence of a code in the entire database of files will be found, sent to the screen, printer or textfile. This collection of all occurrences of a single code is equivalent to a file folder of items cut from copies of documents and sorted into files. This de-contextualizing the coded segments from the files in a database and then re-contextualizing them into a single group is indispensable for interpreting the text in qualitative research and reorganizing the most important parts of documents.

Using *QUALPRO* in this manner, is very much like traditional library research where the researcher extracts quotes from different books (de-contextualizing) and journals to be organized into a new pattern, a paper (re-contextualizing). In fact, combining *QUALPRO* with other microcomputer programs automates many of the manual parts of the research process. For example, the compiled output files from *QUALPRO* can be put into an outline processor and reorganized to represent some topical themes. When edited in a word-processor, such as Word, Word for Windows, Wordstar or WordPerfect, the *QUALPRO* output may serve either as the foundation for writing a report or as supplemental data for a report in process of being written.

## What Does **QUALPRO** Require?

**QUALPRO** operates on IBM PC/XT/AT/386/486 or compatibles with DOS version 2.0 or higher, at least 128 of RAM, and at least one floppy disk drive. A hard disk is optional, but is preferred. **QUALPRO** uses less than 42K RAM but can manipulate files up to maximum disk size (360K, 720, 1.2 MB, 1.44 MB floppy drive). On hard disk systems, file size is limited only by the available space on the hard disk.

**QUALPRO** works with Microsoft Windows 3.0 and 3.1 as a non-windows application. **QUALPRO** can be run either in a window if you have a 386 or 486 computer or as a full screen application. Running **QUALPRO** in a window permits easy cut and paste **QUALPRO** files or between **QUALPRO** and other applications.

### Users Worldwide say **QUALPRO** is ....

"...very powerful without being difficult to use."

"**QUALPRO** proved exceptionally easy to use."

"The tutorial was funny and easy to follow."

"I like the conversational tone of the program. As you make choices, you receive further instructions and messages leading you to the next step. That was very comforting for me."

"Excellent program. **QUALPRO** did what it promised to do. And it did it with great style."

"I loved the manual. It was the first computer manual I could understand..."

"**QUALPRO**'s powerful sorting and retrieving features allows me to spend more quality time with my data."

"It is an enormous advantage to be able to edit in my own familiar word processing program and to be able to apply **QUALPRO** to files I have already entered there."

"I like the fact that when I make an error **QUALPRO** gives me a clear message telling what caused the error and then, and this was really great, precise information on the action to take to correct the problem. I have used a lot of programs, but that was the first time I have seen that."

"...very forgiving of mistakes."

"Amazing. **QUALPRO** helped me to learn to be a better researcher."

"The manual not only marches through a tour of the program, but instructs and delights you as well. Terrific balance between pragmatic information giving and humor. A real pleasure to learn from."

"Bravo! Ever the good instructor with reasons for every instruction. Finally a manual that instructs as well as informs rather than confusing the reader."

"Very useful program. For me the most difficult part of my research was keeping track of all my coded segments. **QUALPRO** saved me."

"I wish I had this program when I did my dissertation. **QUALPRO** would have saved me hours of work."

"I don't recommend **QUALPRO** for my students in my graduate class for Qualitative Research Methods. I REQUIRE it."

### And Finally...

**QUALPRO** is a highly specialized, flexible and automated TEXT DATABASE and PRODUCTIVITY TOOLS for Qualitative Research. **QUALPRO** is menu-driven and easy to learn and use. It is a powerful and efficient tool. The software comes with a comprehensive MANUAL that includes a GUIDED TOUR designed to lead first time users step-by-step through the program operations.

**QUALPRO** costs \$200 plus \$10.00 shipping and handling. Florida residents add 7% sales tax. International postage is \$15.00. Checks, money orders or University or Corporate purchase orders accepted. Education and Dealer discounts available. To order or for more information contact:

**IMPULSE DEVELOPMENT COMPANY**  
2504 Debden Court  
Tallahassee, FL 32308-3035  
(904) 668-9865 Voice  
(904) 668-9866 Fax

**QUALPRO** is a Trademark of  
Impulse Development Company.

## FOCUS GROUP TRANSCRIPT

### TECHNICIANS & TEACHERS

3/2/94

Moderator: The first topic we want to explore is the degree of comfort with which teachers feel generally about computer technology. Specifically, we like to defend the teachers, if you knew them before they took the training at San Antonio and then after working in the labs. To what degree of comfort, to what degree of expertise do the teachers have? Before they started the project and what was the effect on that after the project. Has been in place for a while?

SPEAKER 1.: I'll speak for the English people. There are four of us who went to San Antonio for the training and probably, initially, going down there, we were pretty uncomfortable with computers. I think one of the four really had some experience with computers. And another one a little bit. And, probably, I was limited. And there was a fourth teacher who felt totally uncomfortable with it. Ah, the training at San Antonio helped. And now that we've been into the program, it's really been a lot of just going over ahead of time and looking at the lessons and making sure that the different tools are working or not working and . . . It -- it's definitely -- you can tell it's a research project. It's been week-by-week, lesson-by-lesson. Personally, I feel much more comfortable with the computer and the program. I think the other teachers feel the same way. Two of the teachers are strictly using it as word processor, and they're familiar with that so they feel very comfortable. And the other two of us who have to use all the tools, ah, it's, you know, trial-and-error a lot of times, but, I think . . . we're, we're pretty comfortable with it.

Moderator: Any other comments? Observations?

SPEAKER 2.: Yeah, I can speak, I think, probably, a little bit better for the Math side, being a math teacher myself. Last year there were two of our math teachers who were very ill at ease using computers. I --they probably didn't even know how to turn a computer on, or how to put floppy disk in or anything else. And they were very uneasy when they went down there. They were a little bit less so when they came back. But once we had the computers installed, they spent a lot of time practicing and playing with it, and then as they brought their classes up here they became more comfortable with it. And one of them especially, she came in with the attitude, and told her kids this, "Well, I'm going to be

learning this along with you." And so it was kind of a team effort, and it worked very well for her. I think she probably had the best experience of all of them. And it doesn't necessarily work against you if you're not all that computer literate, because if you come in with the attitude, "Well, it took me a while to how to do learn this so I'm not going to expect my kids to learn it overnight." Then I think that lessens your frustrations. You expect the kids to take a little while to learn it and, sure enough they do, and you expect that. Whereas, I think a tendency might be for the teacher to feel very, very comfortable -- "Well, hey. I know this stuff. My kids will pick it up just like that." And if they don't, they might tend to get frustrated. Ah, as far as our English teachers go, ah, three out of four, I think, were fairly comfortable with computers. Ah, the one that isn't -- she's a non-treatment teacher, so she doesn't really have to do much with it except use the word processing part -- but with the treatment teachers -- one thing I've seen, I think they're feeling more comfortable with the tools. The more they use them they don't have to spend as much time now preparing for each lesson. They used to have to come in and really spend quite a bit of time at the machine before the lesson to make sure they knew everything that was going to happen. And now that they've gone through the different tools at least once, you can see they're more comfortable with it, so now it's just a matter of sitting down -- kind of reviewing . . . familiarizing.

Moderator: And how long did that take? How long did that take --that process?

SPEAKER 2: Well, for each lesson they would probably spend an hour or so at least in the lab just going through the lessons step by step, making sure there were no surprises.

Moderator: How many weeks before they got through the first rotation?

SPEAKER 2: Oh . . . it took about six or seven lessons before they got to all the tools. The earlier tools were the easier ones, so they didn't have to spend quite as much time. But by the time they got the seventh tool, that was really the whole first semester, because they had come in only every other week or so.

Moderator: All right, observations about teacher comfort?

SPEAKER 3: In the beginning, when I first started working with it, there, there seemed to be quite a bit of discomfort about the technology, especially with substitute teaching. But as they got into computers and the program, they realized that it was an asset to have that, and actually kind of enjoyed it. But there are still some areas they feel uncomfortable about,

especially programs, program software. The computers themselves, I think, . . . they realized it's a great asset to have them to actually teach more students. I believe that just about sums it up so far as what I've seen.

Moderator: So the longer the time period -- the more they're in the lab -- the more comfortable they are with the system.

SPEAKER 3: Oh, absolutely. As Mr. Rogacky pointed out in the beginning, of course, the tools are quite easy so they adapted quickly. But as the tools became more complex, then it takes longer. And the same thing for students, it, it takes them a while to understand what they're doing and where they're going. And the teachers are the same way. But once they see that and say, "Well, this 's really great." But, ah, I think it's good. I -- I think they'd say so, too.

SPEAKER 1: We started at the program, I believe, in October by the time we got through the pre-testing? Maybe at the end of October? And we just finished all the tools I think that are on there at the end of February? So, to see all the tools and actually work with them, and be comfortable, it, it's taken a few months. And again, that's what's going in, like y'know, every other week, or sometimes, snow days, or something. But, October, end of February.

SPEAKER 4: I would agree with what was said. Initially the teachers weren't really comfortable with it, because they just had a very summary assessment of the different tools when they were in Texas, but once they could go back and review the tool and use it in the classroom, they'd feel more comfortable with it. And then with each new tool they became more comfortable with actually using the computer.

Moderator: Let's follow up on that for just a little bit. What do you think contributes to their increase in comfort? You mentioned several things, but what, specifically -- a new teacher coming into the system -- what kinds of things could you do to to make them more comfortable?

SPEAKER 4: I would say that it's just a matter of time. If someone has not used a computer before, they're going to have some reservations. They don't know how the interface works, how they use the system, the mouse, inputted information with the keyboard, or even use the text editor. So, just learning this is something totally new, and anything that's, like new, that they've never done before, there's going to be a certain level of discomfort. Like, the more they do it, the more tools they get through, the more



comfortable they get with different programs. The point where, when you get to the end, some of the more complex tools -- having learned the tools previous, I mean, it's going to help them with whatever tool they're working on now. Because at least now they're more comfortable with a computer itself.

Moderator: Anyone else?

SPEAKER 2: This is just a guess, maybe, that something else that would contribute to their comfort level, is seeing that their kids enjoy working in the lab on the computers. So I think that would relax them and make them more at ease also, and the fact that we really don't -- or at least most teachers don't seem to -- have discipline problems in the lab. Most of them comment that their kids are better behaved in the lab than they are in the classroom. So all of that will make you feel more comfortable, too.

SPEAKER 1: I'm one of those apprehensive teachers that you're all talking about. And, uh, for me and for the others, it was simply going in and practicing. And having the time by yourself to sit there, while, with Kim -- Kim and I both did -- and just going step by step what was on that paper, what we were to do, simply going and practicing before you take your kids in there. And at San Antonio, with the training, we saw, maybe, the first -- I don't know -- few lessons, and then they jumped to, maybe, lesson number 12 and we never really saw the middle part of the program. We never got an overview of what it was all about, so we came back wondering, "What is this all about?" And so for each lesson we'd get in the mail we'd go in there and sit down and simply practice and go through it again until we felt comfortable that we could do it with our students.

Moderator: Good observations.

SPEAKER 3: I think basically, anyone who's going to start learning the computer is gonna be afraid. "Is this gonna break it?" Or "What am I gonna do? What am I gonna do?" And once they realize it's just a tool and really there's nothing gonna break it other than physically doing that; it's not gonna hurt anything, then they feel more comfortable with it. I think, I think they see that it's a marvelous tool.

Moderator: Let's switch a little bit and talk about the students. How about the student comfort? Are they apprehensive? How long does it take them to become comfortable?

SPEAKER 3: They adapt most . . . They're very comfortable. Yeah, a lot of times they're off in other areas they shouldn't be, so . . .

SPEAKER 2: I was gonna say, when Dale finds some of his icons missing and the colors changed, he thinks, "Yeah, they're a little bit too comfortable."

SPEAKER 3: So they ought to explore, and I really don't have any problem with that really. I think they should be able to. And, of course, they're ignorant, and to do a lesson -- so they stick to that.

SPEAKER 1: Most of our students, through the junior high, and probably even the elementary had experience with the computer, and many of them have them at home. Um, I asked how many of mine had worked on a computer and there were very few that had not, and even those people, within time -- you know, I, I think they all feel real comfortable with it now. They probably knew more than I did at the beginning.

Moderator: Anyone else?

SPEAKER 4: Yeah, I do think the students do pick up a little quicker than the teachers. Maybe we all agree with that. Because, it's just because, I think they've used computers like you said. A lot of them have computers at home, or have used them in other classrooms. It depends on the students. Some students explore more than others. Some students want to go through the whole program and check out every option that the program offers, regardless of what the rest of the class is doing. And then others are more reserved. They want to stay right where the rest of the class is and what the teacher is saying. Sometimes I find that some of the better students are the ones that just don't follow along step by step with the rest of the class, but experiment with it as they go and try to see what they can do with it at certain points of the program.

Moderator: So, are you saying then that students are coming in with all the skills that they need to operate a computer? Or, in other words, they have keyboarding skills and everything?

SPEAKER 4: No, not all the students. The first day of class you always have a few students who've never used a mouse. You've got to teach them how to use the mouse. Ah, basically teaching keyboard input. You know, you type the text in, you hit Enter to get, like,

a carriage return -- things like that. New paragraphs, whatever it may be. But they seem to pick up on it very quickly.

SPEAKER 3: I think it's because of -- they don't question it much. As we all get older, of course, we're gonna reason more, and, "Why is this?" and "Why is that?" And students seem to just accept the fact that this is what is due and they do it, and when the bell rings they go on to the next class.

SPEAKER 1: Many of them do not have the typing skills. I mean, they'll sit there all period and use one finger. They've worked on a computer but they've just never had typing. And that slows them down, but they can use it. They just don't know how to do it quickly.

SPEAKER 2: That's not a big barrier?

SPEAKER 1: No, it's not a barrier at all.

SPEAKER 2: From what I've seen the kids seem very comfortable too. Ah, Matt mentioned about the mouse. That's one thing I noticed last year with some of the Math students at the beginning. They were a little bit -- they weren't careful enough with the mouse as to where they clicked. And with the program we had last year, one of the bugs in it was, that if they happened to click on an empty space it threw the program into a permanent loop. Well, once they found out about it they fixed the program, so that wasn't a problem any more, but it was a little bit of a hassle at the beginning and the kids would get frustrated if they clicked on the wrong spot.

Moderator: Or they did it on purpose?

SPEAKER 2: That could be too.

Moderator: Ok, let's look at a little different area now. Ah, what types of support do teachers need to be successful with this type of curriculum? And I'm thinking about administrative support, I'm thinking about technical support, training support, what type of documentation do they need, manuals and those kinds of things? What, what really for a teacher to walk into this and be successful -- what kind of supports do they need?

SPEAKER 2: Well, I guess I'll start off then. Number one, I think you have to have a technician around to be able to handle the problems that might come up. It's a great comfort

to a teacher knowing that if something does go wrong in software they can yell for Matt or Dale and they'll be out here, and more times than not they'll be able to fix it or at least be able to come up with something that they can keep working or work around the problem that the software may have developed. So that's one thing that you definitely have to have. Second, I guess it's time on -- time at the computer where they can practice with the lesson. Cindy mentioned that. I think that's probably the biggest thing. Because, if teachers have the time, they can be very creative with the types of lessons they can come up with. Uh, since they've been allowed more flexibility in their lessons from those originally set up to us by San Antonio, the teachers have, you know, they've gotten other readings and other questions where they've been better able to incorporate the computer into the curriculum. But again, that all takes time to do that, so if they have the time to develop these things that would be a lot more helpful.

Moderator?: And where would you get that time?

SPEAKER 2: Well, like maybe another planning period, or if the teachers that were working in the lab had a common planning period so that they can work together on it. That would help also.

SPEAKER 3: I think they need a script too, a valid one, to follow along with the software to be sure they know where they're at in the lesson. That's where most of the apprehension that I feel from the teachers come. They have scripts to follow along and they deviate a little from that and they get lost. And that's important, that they basically understand, that they basically understand the software and the script to give them their lines for them.

Moderator: Excuse me. Dale.

SPEAKER 3: There's no doubt they would have to have technical support because of the complexity of the network itself. The complexity of the software. And unless you've had a massive training program for each one of the teachers in the lab, it'll resolve problems that arise.

Moderator: When you say "massive" what do you mean?

SPEAKER 3: Well, it would take a long time to train each one of the teachers on the IBM machine, how to operate the DOS, Windows, the software they're running, plus know how -- and, well, you've got to know the hardware thing too -- so, "How does the monitor

work?" "How does the computer work?" "How about the keyboard?" "Why didn't the mouse work?" All these things, so it's just about necessary to have someone with that knowledge for to support the lab.

Moderator: Anyone else?

SPEAKER 4: I would agree with that. I find a lot of times, uh, when we're talking about comfort level, teachers are most uncomfortable when they get in there (and Matt and I have seen it before) and we've had a number of application errors that are due to bugs in the software. But it's still in testing stages and that's to be expected. But, at that point the teacher does not know what to do to correct the error. This is what Dale is going back to, we have to train the teachers on how DOS works, how Windows works, and how the software they're running works. And it would be too much to, I think, to try to train every teacher who's using the lab, those skills that, when those errors do occur, they themselves will be able to solve them without having to go get someone. Now, at some point that may be a possibility, training teachers how to resolve those conflicts when the software itself is extremely stable. It's very rare that the Math student will hang . . . so in those classes it is less common. But, uh, right now as far as our lives with the number updates, we still have errors. And really, the teachers don't know what to do. And if the students loses his work, how do you recover the work? You know, how can you get the student back to the point where they can work along with the rest of the class? They really do need help I feel. I think they would be very uncomfortable with the lab itself if they were expected to do all that themselves.

SPEAKER 2: I, I agree. I don't think most teachers would want to know all that. Teachers have enough to do just trying to come up with the lessons and everything else that having to learn all that and worry about that, I think that would probably turn them off to even coming into the lab, if they had to learn all that and worry about all that. Their primary focus is and should be the lesson and teaching it to the kids. They should not have all that hanging over their heads.

Moderator: Okay, so that implies then that there needs to be other support, from the school's point of view, to hire extra people. Do you agree with that?

SPEAKER 2: And just to go back on one thing Dale was saying -- the script -- it's kind of ironic you mentioned that because one of the things that Pat Williams was talking about today was that we really need a good set of instructions. Like, for each tool, for cubing,

these step-by-step things, not the script that we've been sent, and she said, "Yeah, I'll even write them" but I think that would be helpful if we just had step-by-step for Cubing, Sideboard, Revision. You know, how you use them, not just in one particular lesson, but something that would work for any lesson.

SPEAKER 3: What the menu functions are . . .

Speaker: Exactly. You know, what, what, what you do now, how you create an introductory paragraph, and then, just, like, sequence of steps, very simple, that the kids could also have too, rather than the big packet, really, we've had so far.

Moderator: Sounds like you've hit upon something that would really contribute to the whole thing. You'll have to give credit to Pat . . . in your spare time. Any other comments on this?

SPEAKER 1 Some of that too needs to just be on the screen, I think, you know? Instead of always having to look at a paper. They think maybe that that program can do something, you know? You can follow on the screen? That's what Kim and I talked about.

SPEAKER 4: I've talked about this with a teacher. It seems that a lot them would like context-sensitive help where, at any particular point, instead of just calling up the help screen description of a whole window, where they can get a description of what each of the buttons and how this window fits into the overall scheme of what they're doing with the tool. I'm not exactly certain how it should be implemented. I think it would make the tool easier to use for both the teacher and the student.

SPEAKER 1: I have just one comment. Having a common plan period is a great idea but it would probably never happen. Having a second plan period would probably never happen either. Ah, so really the only other option is, you know, before the start of the school year, to have a thorough training session. And now that maybe this program has been through it one year and you can see all the lessons and the overview -- to do that, if it, you know, before, the school year starts.

Moderator: Kind of a retreat where the teachers all come together and share their ideas?

SPEAKER 1: Yeah. And the administration would have to be committed because the teachers are very giving but I'm sure with all that extra time they're going to want to be paid

for that and they're very deserving of it. But, uh, you'd have to have that training because it's not gonna happen, you know -- with the plan periods, it just, drop it right now.

Moderator: What about the students? Do they need special support systems? Is it important for the teacher to be in the room? Is it important for the technician to be there?

SPEAKER 3: Somebody needs to be in the room, yes. Absolutely. They find all kinds of things to get in to. These chairs, for example. . . They go up and down. They like bouncing those around. And plus they're always talking to their friends and stuff. They need some type of control.

Moderator: You said we owe support with the software.

SPEAKER 3: Support for the software for students? Well, like I said earlier, I, I think basically they follow instructions very well. I've noticed that about them. You tell them exactly what they need to do. They'll just accept that and go on. They'll do it with a minimal amount of instruction.

Moderator: Any observations about students, the things they need?

SPEAKER 2: Uh, San Antonio has said many times that, uh, the software is not designed to replace the teacher. The teacher has to be in there with the kids. And they've also said that sometimes you may work harder in here than you would in a normal classroom. But hopefully the benefits are going to outweigh that.

SPEAKER 3: I feel like maybe going out on a limb here. Technology is available, or will be very shortly, to where you have like interactive video and it's possible with a network for the student to come in and sit down and the computer will talk to him and he can, like, push buttons, and get into a data base, or whatever he does. So that, that, that may be something that is going to evolve from this, I hope, and make it even better.

Moderator: What you're -- if I understood what you're saying is, is that if we use multimedia, the machine itself would give instructions.

SPEAKER 3: More so than it is now.

SPEAKER 4: I would agree with that. There needs to be a guided focus, because the students, while it is an interactive tutor, if the students were sat down in front of the machine and told to get to work, not having used it before, they would not get anywhere. The teacher needs to take the lead and say, "This is what we're gonna do today and this is how we're gonna do it." But once the teacher has given the instructions -- and the students do pick up on it very quickly -- and you follow along and do whatever is necessary. And one of the teachers in particular, she has set a set number of problems she expects out of every student in Math, uh, word problems on the tutor, and it motivates not all of the students, but some of the students -- to at least have a focus of knowing how many problems they need to get done before the end of the period.

Moderator: Anything else? Let's take a look at another one. Another area. This is the curriculum area. And, uh, to what degree is the curriculum that is in your schools correlate to the curriculum on the software? What does it take to correlate the curriculum with the software?

SPEAKER 1: I'll address that. Ah, being the year of research, and not knowing what the lessons really were ahead of time, we've pretty much had to go with what's in the lesson, as far as the text and everything else. Ah, we had so much to do in the classroom that, so far, it hasn't really correlated. It's like you do what you do in the classroom if you're reading a novel or whatever, and then you zip over to a computer lab and it might be something totally unrelated. I can see definitely where after this year, next year when we know what the tools are and what texts we're using in the classroom with work, then it would be a great program. But this year it's been very difficult to try to accomplish what we're doing in the classroom. There's been little correlation. Right now, since we know we have the flexibility -- we didn't know that before, how flexible we could be -- ah, I think for the remainder of the year we'll try to make it match what we're reading in class more. But, ah, initially it was pretty frustrating.

SPEAKER 2: I think we had the same problem in Math last year because when we got the tutor we had only maybe two or three different modules of problems to choose from, so they didn't always match what we were doing in the class. Now this year we have a full set of modules and teachers can choose from them, so they can make them correlate pretty well, and especially with the proficiency tests. In fact, one of our teachers right now, since a proficiency test is coming up next week, when she brings her class in she's chosen about eight or nine different modules. It's the first two levels and kids get a little introduction, just



a little brief review from eight or nine different types of problems that they're gonna see next week.

Moderator: This is an area that we are interested in exploring also -- relationship between the curriculum arm and testing patterns to your school testing patterns in terms of not only the achievement texts but proficiency tests. That's a very important observation.

SPEAKER 1: And I think the Math at Trotwood -- and again I'm not that much aware, really, of the Math -- but, ah, I think the same thing, I think that last year it was kind of difficult to and this year it's, well, you, you can probably comment on that.

SPEAKER 4: Um, yeah, the Math teachers feel more comfortable with it this year, like I said earlier, last year was still very much in the research stages and there were bugs was more frustrating to them last year than it is this year. This year they came in and they'd used it the previous year and were very comfortable, really, using it and knowing how it worked, and how to set it up and what to expect from it. So I would agree that this year they're more comfortable with it because they can set up -- especially in Math -- you have a number of different curriculums that you can choose from -- teachers this year have been choosing what applies to what they're doing, what they're teaching in the Math classes at that point. If they're doing fractions, they're doing fractions in the lab..

Moderator: Any observations?

SPEAKER 3: Well, well, I don't know about whether it correlates to lab or the classroom, because I'm not familiar with what they're doing in the classrooms, but I think the teachers like to report stuff like that. They're easy to read, and, and, uh, they're very specific. A student says, "I did this much" and the teacher says, "I'd like to take your word for it" but with the reports there's no lying about it. They like that idea.

Moderator: The reports are timely and the teachers use them?

SPEAKER 3: Sure. They can get 'em on the hour. The class is over, they get the reports immediately.

Moderator: Any comments about the reports, and things like that?

SPEAKER 1: It's very helpful.

Moderator: Do you have any thoughts on that?

SPEAKER 2: I guess the only complaint that we have right now about the reports, generally by the Math tutor, is it takes forever for them to be generated. The more times the kids are in the lab, the program searches every problem they've ever done, every date that they're ever been in there, in order to give you a report just for one particular date. So it takes quite a bit of time now to get a report. This is something that they had -- the people at San Antonio -- had said they were going to address, that they were going to put in a routine that would make it much quicker to get the reports, but they have not done that yet.

Moderator: Have you had any thoughts about the curriculum? How these software matches . . . What about the achievement tests that your school districts are involved in? Is this of benefit to students taking the CAT-- isn't that right?

SPEAKER 1: Trotwood doesn't use the CAT. So we mainly -- it's really just the proficiency tests. Ah, later when they take their SAT or ACT.

Moderator: Have we explored the relationship of the proficiency test and the software?

SPEAKER 1: Ah, it really seems to benefit the writing more. Ah, overall, the program, I think, just really -- it gets the student to focus on using details and being specific with what they're saying which is what you want them to do in writing anyhow. Ah, I think again that's probably our main emphasis and there's the writing part -- I mean they'll have selections they have to read and maybe highlight the main ideas so, and that way I guess it gets them to read a paragraph more critically. But, uh, I think I see more help for the writing.

Moderator: As opposed to reading?

SPEAKER 1: Right now, I would say, right now -- yeah.

SPEAKER 2: One thing I've kind of liked, you know, again I'm not in there with an English class, but one thing that I would think would be helpful is a lot of the prompts that they're given for the lesson or the things that they have to do, like, ah, choosing a reader. You know, "Who are you writing this for? What is the purpose of your essay?" are very,

very similar to the types of assignments that you get on proficiency tests for writing. So, when they get to the proficiency test it's "Hey, I've done this before."

Moderator: So there's good correlation between them? Okay, one more area, ah, that we kind of touched on this before -- ah, student motivation. Specifically, student behaviors in the classroom as opposed to the lab. Differences? Do we see this program affecting student motivation to work harder?

SPEAKER 2: I've never had the good luck to have a class that I could bring in here on my own, so I have to always rely on what other teachers tell me, and the types of things I hear is that the discipline is much better in the lab. That they don't have the problems that they might have in the classroom. Um, there are some kids who work much better in the lab than they do in the classroom. There are some kids, they say, who don't do anything in the classroom, but when they get to the lab they are very enthusiastic and they put out more effort. I've, I've never heard the reverse though of a kid who worked in class but didn't do anything when he came to the lab. But then there are some kids that, no matter what you do, you know, it doesn't seem to make a difference. But, it just seems to have a positive impact or no impact, but not, definitely not negative.

Moderator: Any other observations on student behaviors?

SPEAKER 1: Ah, with the writing in the lab it's definitely a motivator and you can get students to write in that lab and revise and correct their mistakes and they will do it. And if you would try to get them to do it in the classroom it would be a battle, and they're very willing to do that, and we have a couple of our, we call them A-level classes, the lower level of the developmental classes, are participating in this, and even those kids get in there, and are, are, I think, very much on-task about what they're doing. And again, that can be quite a battle back in the classroom. It's definitely the way to go -- using computers. . . I've seen a few. . . We also have another program at Trotwood called Oasis and they are the very much at-risk students who -- it's like our alternative school -- and they're in there also, and I have seen some of those students who -- and it's only a handful -- they obviously don't want to work in the lab either, but, ah, I think those are isolated students. Over all, it's very much a motivator.

Moderator: Student motivation -- observations?

SPEAKER 3: I think they like it, uh, they've got their own place. They've got their own computer to use, so it's exciting for them. And I think sometimes they probably learn

something they don't even know they're learning at the time. Kind of sneaking in the back door, so to speak. And also, I might go out on a limb here and say that I think it might be possible to identify a student that may require remedial teaching in a lab like this, more readily than in the classroom. I hope, I hope that's the case.

Moderator: Why, why would you say that?

SPEAKER 3: Well, like I said, it's, it's, ah, the students are isolated from one another, basically. Like I said, they got their own screen, their own station, and it's easier for the teacher to monitor them while they're all busy. I don't know what the environment's like in the classroom. I, I really don't. Whether the teacher has control, has attention of the students or not, or what the students or doing or what they're even thinking. You know, if you're sitting here typing at the computer you can pretty well be assured they're at least concentrating on something that's pertinent to the lessons. I, I think that's all. So I think the lab is good. And I'm surprised it took this long to happen.

SPEAKER 4: I would agree with Dale. I can't make any comparison of their motivation here to the classroom because I've never seen them in the classroom. But, there are some things that I think really do motivate the students. One is the Math's problem-solving tutor, and it gives them immediate feedback when they solve the problem. And I think some students, that really motivates them when they actually, because they got immediate feedback, "Yes, I solved it correctly!" Then they can go on to the next problem. Some students, I think, that otherwise wouldn't be doing problems if they were told to do them in class, "You've got to solve so many problems today." Would solve them here because they are in a situation where they're getting feedback, "Yes, you did this correctly," or "No, you've made a mistake here and you need to look at this a different way." Um, and I agree that -- I've been told by the teachers that they are better behaved here in lab. A lot of the students do attempt to do the work, whatever it may be, and I feel they're motivated by the fact that, "Yes, here is something that we're doing," whereas, if they were told to write a paper in class it would be a lot harder to get them to write a five-paragraph essay in a few days in the classroom on paper and make all the corrections on paper than it would be here in the lab. They can make the corrections immediately on the screen. They've got some variations that are interesting to them, too. So I think it's a good thing. I think both programs have definite benefits.

Moderator: What about student attendance. Is it better on days that you attend computer lab as opposed to the classroom? Have you noticed anything about that? Any difference?

SPEAKER 1: I'm not sure I see any correlation there. It seems like the students that have the attendance problems, it doesn't really matter if you're in the lab or not, and the students who are always there. They're always there. Uh, I'm not sure, ah, I don't think I see any difference.

SPEAKER 2: It's gonna be hard for me to comment on that one too. Uh, some of the teachers have made comments that some of the kids are upset when they found out that they missed a lab day. Now whether this translates into them making sure they are here for the next lab day or not I don't know.

Moderator: That would be an interesting question too.

SPEAKER 1: Did they do some surveys about that at the beginning of the year, and then, isn't that gonna be a part of the data collection at the end of the year as far as "How do you feel about lab?"

Moderator: Yes.

Moderator: What do you think is the right, most correct, most beneficial ratio? Is one day a week for one hour in the lab and four hours in the classroom; is that the best organizational structure? Or could you think of some other types? Should it vary from this lesson to that lesson?

SPEAKER 2: I, I think it has to vary, and also on the subject. You know, Math, ah, one hour a week is probably good; in fact that's what most of the Math classes are doing, but for English, you know, in one hour you can't write an essay. You have to be in there two or three days in a row to be able to complete it.

SPEAKER 3: I, I think, I got an opinion on that. These kids are hyper. They come into the lab and it takes them 15 to 20 minutes to settle down and by then they're just barely getting into the lesson and by the time they get started, why, it's time for the bell to ring, so it's something -- they need some time to calm down. You know, hour and a half or maybe two hours in the lab might be sufficient for English. Math -- I suppose an hour would be fine. But, ah, most of the teachers that I've supported, I've found that they're, they're kinda pressed to get the lesson in the time they're allotted, and that's part of the reason, that's not the whole reason, of course, being unfamiliar with exactly what they're supposed to be

doing with tools and all that, and it's students the same way, and that slows things down too.

Moderator: These are good observations.

SPEAKER 1: Definitely for the English, I would never want it to be where you have to be in there every other week for so many days. What I would have to do is look at my curriculum. "This is where I'd like to use the lab for my writing assignment." Uh, and kind of do it that way, and some of the lessons we found are probably four days and we needed more time for that instead of it being three days. Ah, I would have a real hard time, you know, every other week, going one day or two days. It would have to really fit my curriculum where I could use it practically with what I'm doing in the classroom, because it could work absolutely beautifully that way. And, ah, I'm really looking forward to next year when we can do it as we would like to do it.

Moderator: Comments on that?

SPEAKER 4 I would agree with that, that some of the teachers feel pressed for time, and given only a certain number of days, not having gone the last year. It's hard to know how much time it takes to do it.

Like I was saying, now that the teachers have used the software for a year, I think it would be easier for them to gage how long it would take for students to complete a certain task in the writing portion of it, and that next year they could say "Well, I want to be able to take them in to do this for four days, and be able to use those four days and have them finish whatever task it was they had in that four days." Whereas, this year some of the teachers have -- only half knew some of the lessons. Given the time that was allotted, by Armstrong Labs for them to do a particular lesson they felt that maybe the students weren't as happy with -- and they didn't get it complete, totally revised paper back from having been in the lab, but only a partially done paper. But, but, I think with more use of the tools, the more flexible the schedule, where the teachers can say "I want this many days in April. . . from two to four." The more the software is used, the better the result will be.

Moderator: Would you all say the best way for students to learn how to use this is to do it through lessons or should they also do it through the training program?

SPEAKER 3: Well, it's been my experience -- I have an opinion about it of course. I think they do need training. Then have the teachers. It's been my experience that the subject tools

are very complex and at different levels. Especially the idea of word and the revising, and what's the other area?

Moderator: Cubing.

SPEAKER 1: Cubing. They've got a lot of fancy corners and menus and things like that.

Moderator: I've seen that too.

SPEAKER 3: Yeah. The kids aren't . . . they just basically follow instructions. And I think maybe they might feel more productive if they understood it better. Just maybe have an hour or two where they can just come in and just, excuse the expression 'go crazy' on it.

Moderator: It's a good treatment of this concept. Do you have any thoughts about that?

SPEAKER 1: Um. Some of our students definitely need that structure -- "This is what you do now. This is what you do next." And if there is a training session or taking them step-by-step through a lesson, I think it needs to be done by a classroom teacher, um, someone who understands where ninth graders are coming from, what level they're on, especially those lower level student. And a classroom teacher also knows what they're looking for in the writing. This is what you need to put here, this is what you need to click on here. But for a lot of those students, you really have to go step-by-step -- this is what you do, this is what's available to you. And again, how that's done, if it's done in the beginning or whenever, I think classroom teachers . . . it needs to come from their perspective of working with ninth graders.

SPEAKER 3: You know, I've noticed that with some lessons that's the way in the beginning you show them this is what we're going to do today. And think teachers just kind of go along with it, and everybody just goes along together. I don't know which way works best. I mean, they both seem to be effective.

SPEAKER 1: I mean before, we didn't realize the extent of the lesson we were really pressed for time. Initially, I would like to walk them through a lesson, "Now everybody, click on this" and let them do it. That's how I would prefer to do it. We didn't know. You know, pressed for time, it's like, "Ok, this is kind of where you're headed today, and then let them get started on it. I felt very pressed for time in a lot of these lessons. I would like to

have walked them step by step, "Let's all do this. Let's all do this." And do a lesson together before you put them out on their own.

Moderator: Thoughts on that, Ron?

SPEAKER 2: Well, we're getting going back to last year with the math tutor. I saw teachers doing it both ways, too. Some teachers who would take their kids step-by-step through a problem or two. And then we had one teacher, I think she showed one problem, that's one problem on the overhead and would say, "Now you do it." And I remember I was back here with PLC last year, with Nancy Bearwald, and we just looked at each other, and we said, "Oh, my God, she's throwing them in this after one problem." Yet it worked for her, and the kids did fine with it. So, I guess there is no one correct way to do it.

Moderator: So there's no magic bullet. Let's . . .

SPEAKER 1: I'd suggest walking them through it.

Moderator: Walking them through it.

SPEAKER 1: Being given the time. I'm terribly pressed for time this year. I would do it differently.

Moderator: Do you feel constrained by the 50 minute period of the day, or is it . . .

SPEAKER 1: What we thought we mandated to us by, by the Air Force people. You know, "this lesson needs to be done in two days." Ok, this lesson . . . It wasn't until much later that we found out, "Ok, you can go ahead and extend your lesson." We didn't know that, so we were trying to get it all done in the number of days they told us. And that's why preparation was very important to them. And some of them can do very with with that. With others, you have to go back and say, "Do this. Do this."

Moderator: Well, in summary, we took a look at feature comfort, technology. We took a look at student motivation, organization and support, and the relationship between the curriculum. If you were asking students and teachers questions, are there any other areas, or any other questions that you would feel like asking to would help clarify how people operate this kind of device?



SPEAKER 2: You might ask that students if they think what they're doing in the lab is helping. If they think they're becoming better writers or better problem solvers or whatever. And I think that one of the things that's on the survey at the end of the year that they'll be taking.

SPEAKER 1: I think the results of those questions would be much better the second year. There have been so many glitches this year, and so much, I don't know, the lessons being overwhelming, that next year, I think it will just work out so much better than, you know, what we've done this year. But again, that's just part of being, I'm sure, the first year of research, you know, that's what this is all about. It's a great program, and these last few lessons that I'm going to do, I'm going to correlate it with what I'm doing in the classroom. It will just be ideal for what I'd like to do and have it on the computer.

Moderator: Anything else you can think of? Anything you'd like to ask?

Moderator: I've got one more question, and then we'll let you go. One of the surprising findings the Armstrong people found from last year. They were surprised by it. Was that students' attitudes towards computers went down. They became more negative they got toward computer technology, useful technology, into useful technology as the year progressed. Any observations you might have to explain that type of thing?

SPEAKER 2: We had talked about that before, and one of the things that we come up with was that in the past, the only things that kids may have done on computers were games. Where now with the math problem solving tutor, they were expected to do some work and some thinking. And the computer was no longer a game, so for that reason, their opinion may have decreased somewhat.

Moderator: Any other observations?

SPEAKER 3: I think the program crashes were frustrating for them. Anybody sitting and typing a half a page or a full page at a word processor and the program crashes, it's gone. So they have to repeat that work. And then it crashes again, and maybe he can't get it back, or something like that. Same way with the math problems. We have a student that knows he can sit there and wipe a problem out on paper, exactly how are they supposed to correct an answer when we cause the problem he's working on is guided, it's very specific how many problems he must solve. So he gets frustrated in that area too. Other than that, that would be the only thing I could think of that would cause opinions to fall.

SPEAKER 4: I would agree with Dale. I think it becomes more frustrating for the student because there is definite feedback the teacher is getting print outs of what they've done, and the math teacher gets a summary of what problems. He said a game is something they have fun at, but on this they're being graded on. And also the frustration that Dale was saying. Problem crashes or problem errors, you know. I had a student in here the other day working on the unguided section of the math tutor. You can just say, 'answer question,' right, even if you don't have your full equation going. Put in the correct answer, hit 'enter', and it works out that even if you didn't build that equation, it gives you the correct answer. And he'd gone through a number of these, because he was just frustrated at having to label everything, and give it its value, and put it into an equation. So he was just going through and answering as many questions as he could during that time. And I think there's a certain level of frustration there with not being familiar with the tools. They know what they want, and they can't get it. They know what it is they want to do, what they're supposed to do, but they are not fully conversant with the interface. They don't understand how to do it. You know, they have to ask someone, "How do I this? How do I get from here to here? You're now on this screen, how do I get to this screen?" I think it's frustrating for them when faced with that. Especially when they can see they're being graded on what they do in class.

Moderator: So you would say then that they have really redefined what computers are, in a new perspective.

SPEAKER 4: Right.

Moderator: And that new definition is tied to working, and that's not quite as much fun as games.

SPEAKER 1: I agree with Ron on that. I think that they have to think, and they have to perform. And many of them really just don't want to do that. They'd rather maybe be lectured at or something. When they have to do the work, it's . . . I guess it's work.

SPEAKER 3: I've noticed something . . . I've noticed that when the students come into the lab that don't do very well in the classroom, and then they come in and go off on tangents on the computer. And actually, it takes quite a bit of intelligence and aptitude for them to do what they're doing, to move throughout the program. And that . . . I found that surprising. Pretty exciting, really. It gives a person that maybe doesn't do that well in the classroom to really have some ability, so maybe a lab like this might bring that out in them. I hope so.

Moderator: Ok. Any other thoughts before closing?

Moderator: Well, I want to thank you for your time. We appreciate it. Each of you will get a copy of the final report. And if you want a copy of the videotape, we can have that for you, too.

SPEAKER 2: I think I'll pass on that.

Moderator: We want to thank you a lot.

## FOCUS GROUP TRANSCRIPT

### DUNBAR TEACHERS

4/27/94

Moderator: We're hoping that as you talk about each of these topics the synergism of what you interact with, we want you to talk to each other what you and I'm not going to be saying anything except prompting you with questions. I'll be trying to guide you and focus your attention on particular topics. And in talking together, we're hoping to discover some things that are not on this. And that's the purpose of this activity.

Ok. What we're going to start with is what we found out long ago is the degree to which you were familiar with computers prior to becoming involved with this project. So, we'll let you talk to each other. So, whoever wants to can start.

Speaker 3: I'm very familiar with them. We also had Apple computers in here and another lab with Apple computers and we had the students in. And I was utilizing that lab also. So I was comfortable with it.

Speaker 1: I had used it with my classroom also. I've taken several in-services and plus at U-D, I did my concentration in computers, so working in the lab with the students and utilize it to enhance the classroom, I had done that, because we had the lab, like she said, with the Apple computers in the classroom. But not so much with the word-problem solving, not, the software that we used was just a little bit different then the tutor, the Type II, because it wasn't as much reading with the other problems as it was with the word problems.

Speaker 2: I had very little computer experience. In terms of usage with students, I was at zero. I had maybe taken one course just to be familiar with the keyboard and different parts of the computer, but as far as use and usage of it in the classroom, I'd say none. Therefore, I was very uncomfortable. I didn't feel adequate, so to speak, to use it at all. So it was very important to me that I get some experience and exposure a lot of talking, and help, and all kind of things like that to build up my confidence before I used in the classroom.

Moderator: So when you went down to San Antonio -- I think each of you went? -- did that give you that confidence?

Speaker 2: Not really. I'm saying, I don't mean they didn't attempt, but my confidence came from my colleagues. I needed it once we got here. Down there, it was just a matter of showing me different things and being with other people who also had experience. It wasn't as though those without experience were grouped and those with experience were grouped. So, I would say I wouldn't get my confidence there. I got it after I returned back to Dayton.

Moderator: In determining, in predicting the success of the teacher to use this, do you think that's really important? The training.

Speaker 2: I think it's essential. I think it's important, but I won't say that it can't be done without the prior training, it would just, to me, make the program move a lot faster because you don't have to take that time and extra effort to really try to make sure that you know it before you feel comfortable presenting it with your students.

Speaker 1: When we were starting to teach math, we had practice before and we go through training. And the same thing with these labs. It was a pilot program, and that made it inconvenient because things were not worked, the bugs. But to have someone put into a pilot program with little experience, that enhanced the difficulty in the beginning with someone with no experience in the lab doing a pilot program. But I think that each teacher, you're teaching the student, and they want you to know it. When you don't know it, it's hard, difficult for them to feel confidence when you don't know the information. I think that anyone doing the program should have time in lab, and feel comfortable at least working on the computers. I mean, it can be done but through the experience that we went through, if we're going to make things better, I think a person should go through some training. And make sure they feel comfortable with what's going on.

Moderator: As a result of the involvement, your comfort level has increased?

Speaker 2: Sure. You mentioned Texas; I think a lot could have been done at that level. I really do feel it should have been done. If they were aware, and I don't know how aware they were of the percentage that had no computer experience either. You know they, like you said, maybe they were assuming that those involved had it. But even with those that

were just getting used to using the computer and even just the various parts of the computer -- the keyboard, so to speak -- if at that point they were separated or they had their little workshop, you know, and then things were demonstrated with them, and then maybe back in the group I think it would still be a better experience.

Moderator: Let's go ahead and talk, then, about after you came back from San Antonio and then into the classroom, what types of support were essential for success? I know you had technicians in this group. What types of support do you think were really important to make this program really help the students?

Speaker 1: We had a very good coordinator. That's it. A good coordinator is someone who is not teaching but someone who is free not to be involved with the program at the time. A good coordinator you know, they have things ready for you if you need assistance -- you know the type -- and someone who has patience to help you when there's a problem in the lab.

Speaker 2: And, too, the meetings were very important at that time. We met once a week, so especially at the beginning.

Moderator: You had released time for group planning?

Speaker 2: No.

Speaker 3: I wish. We need it.

Speaker 1: That would be nice.

Speaker 2: No, we met after school. And I mean, we, as a department, we have a very close department. We work well together, and we were in here late hours after school just practicing on the computer, supporting each other, and that type of thing. And then we had our business part of our meeting, and then we would come in here and just practice and do problems, whatever would come up, we'd just try to handle it together. If one had a problem, we'd all kind of be there together so that if it came up with me, then we knew how to handle it. So, that was essential to me.

Speaker 3: A good lab tech is very important. Last year and this year, he was the one that was coordinating on the computer as far as what each class would take. Last year, he was good, and this year the one is also excellent.. Never taught before, but he gets along well with the students, and the students feel very comfortable asking him for help because they see is they've gotten the code on something that says "ask the teacher for help" and I'm helping someone else, they feel very comfortable asking the lab tech, and he worked very well with the students. And that was very important too.

Moderator: What amount of help from central administration, what kind of support did you get?

Speaker 1: We were allowed to go to San Antonio.

Speaker 2: That's true; that's true.

Speaker 3: Because they had a minimum number and they paid for the whole math department to go, so that was supportive.

Speaker 2: What else did they do?

Speaker 3: They supported class size. They had to put 25 in each class. That's a big thing. Because last year.

Speaker 1: That's a big thing around here, that's right. Because last year was really a bitch. Because there wasn't that many math teachers.

Moderator: If you were going to suggest what types of support you should get from administration, what would you add to that list?

Speaker 1: Some release time.

Speaker 2: I'm serious, we spent a lot of time here late after school. After 5 o'clock it was nothing for us to be leaving here. We all stayed, it's not like someone left and only a few stayed we all were here together. And that makes for a long day, but we were willing to do that and so release time, I don't think that would be asking too much.

Speaker 1: I was thinking that maybe an aid in the labs would be nice since the lab will be used by others teaching math and science and eventually science and English, it would be nice to have an aid that would be here.

Speaker 3: In place of a tech?

Speaker 1: No, in addition to.

Moderator: Would this aid, would this be a professional aid, or would it be a student, or what kind of person are you thinking about?

Speaker 1: It could probably be a student with some knowledge of computers. We do have some students who would work well in lab.

Speaker 3: Some of our students who are taking their third year in computers.

Speaker 1: But it would have to be someone who is knowledgeable in math. We have several students -- you know, seniors -- who could come in and help. Because they would be able to ask a question, and if you had a full lab -- if you don't have a full lab it's not too bad. But if you have a full lab -- like 25 -- that's a lot of students and you cannot . .

Speaker 2: That's a lot. Especially for beginners.

Speaker 1: And there's no day that you can say that you will not have questions. But if you wanted to take, make the best of can of their potential to learn, if more students could have their questions answered because once when Nancy was in the lab and the lab technician, there are a lot of questions that are being asked and even though the computer is there helping to tutor, but there's still questions, especially in the beginning, too.

Moderator: So you're saying there's a lot of individualized help needed?

Speaker 1: Yes. Just questions. Just to keep things going so they'll stay on track, and they'll increase the number of problems they'll do, or at least attempt. I just, I get to see you know, a lot of these. And another thing is our absenteeism. And so a student who is absent and comes back, maybe they were absent from class the day that whatever is being taught was previewed, in the classroom, too, to that means . .



Speaker 3: That's been changed. Now, wherever the student has been stopped, and if we've started a new thing and they were absent, and they come in, they'll still get a short explanation on how to do it.

Speaker 1: So it doesn't bother them now?

Speaker 3: No.

Speaker 1: Well, that's good then.

Speaker 1: Well, you were in the lab this year, the program is a little bit different, so is it? Would it be necessary for a lab? I'm thinking about last year.

Speaker 3: I'm saying, the lab tech is needed. Coming from the classroom, and the lab tech will even tell you. I've asked the lab tech what he's noticed different between my class and, let's say, Ms. Van Dyke's class and Ms. Van Dyke's class has the high attendance problems. But with my class it's always packed in here, and I need them in here to help.

Speaker 2: But would an aid be beneficial though?

Speaker 3: Yes, because everyone of these seats is full.

Moderator: What about -- we've talked about technical support and that's important -- what about training support? You indicated that you had trained yourself, what would you say would be an important in terms of additional training or assistance in the lab?

Speaker 2: One-on-one, I would say. Demonstration or first hand someone there. Tutoring, so to speak, as you go through the problem alone. Because in Texas, one of the gentlemen there, he was with the program -- Kirk was his first name -- but he so willingly gave up his time to remain after the meeting was over and spend time with our whole department. And individually I know I needed his assistance at that time. And he just took the time to go through a problem with me and that made a big difference. I mean, to know that immediate reinforcement, that I was doing it right. Or if I wasn't, he was there right away to show me where the error was. Then I could back and correct it right away. So

that more than anything is valuable. It wasn't like it was a whole difficult thing to try to understand all at once, but it was something new. So that's what makes a difference.

Speaker 1: I think, too, you have to have someone who is going to work with this trying to teach. Because we have other steps. And trying to learn this at the same time is, it doesn't, it makes you uncomfortable, it makes you angry. Because you get frustrated. Two things: I think that maybe the administration could maybe offer a stipend to come in like two weeks early. Someone come in and go through the program, because they would have to at least compensate someone to take off their time. I know we're in the program, the person would be in the program, but if they're going to start it, to at least go through it so they have at least you know you have a week before school starts, before all of the hustle bustle. Because right now we don't breathe, we just go from lunch, we don't eat lunch. I mean and trying to do the program, things are different. It hasn't always been like this, but with the demands on paperwork, and demands on, not only our administration, but the Dayton Public administration, demands on the parents, demands from the parents and students, jobs, the way students are, their activities are different. We just don't have the plan, like someone said, a planning period. You try to cram in everything. You don't even have time for lunch. Go ahead and do paperwork. Especially in math. Now, the other subjects I don't know, but I know with us, we don't.

Moderator: Anything else along that area? Ok., let's take a look at the curriculum and the relationship to your district curriculum. Is it correctly organized in a way that facilitated the curriculum? What are your feelings on that?

Speaker 3: Some of it, but not completely. When we had the algebra and formal geometry, it fits right in, and that was the basis of where it was really coming from. I had to adjust it this year so that it can fit in with what I'm doing. And I've gotten to a certain point now where the student would be taking in formal geometry if the student had gotten to that level in the algebra part, so they're coming to the lab and they're not really doing what they're working on in class any longer, it's no fulfilling the class objectives. But initially, first semester, it did.

Moderator: Any comments on that?

Speaker 1: I think that from working on the new software it could enhance to review some of the skills the students were supposed to get when they ran the basics in there. Because

we teach algebra, Algebra I, at their level, first level here, and so some students have not, are not, proficient in some of the basic skills. So some are things that, topics that could be used for that. There was a difficulty when we were teaching it, correlating it to the classroom, correlating the topics to the classroom. And I guess you have to have a mindset of how are you going to utilize the lab to enhance your classroom, whether it's review to enhance just problem solving in general, to extend, like she said, her students haven't gotten to the point in formal geometry, but they do need those concepts on the standardized test, proficiency tests, if they're taking their SAT or ACT or whatever. Maybe they haven't taken geometry or maybe it's just a CAT test, and this would sort of help. We could, you know, use it to enhance their skills. But it would take some planning ahead how that would fall into place. When it wouldn't, when the software does not correlated to the topic itself. Because sometimes review can be boring in the classroom, but the student knows the lab makes it a little bit more fun for the students, so if you review some of the topics that they maybe need like geometry, you utilize as much at one point in the classroom that you might. I can see it . . .

Speaker 3: You can use it in geometry. In fact, I told Sue for the second time they took the CAT, I had been I went in there that whole week, and I had the students doing geometry word problems and they got exposed to that. Not for the CAT, but for the proficiency.

Speaker 1: The formulas for area. Because they, the software has formulas but it's in a more of an application-type procedure, not just "Here are the areas. Find the area." It just gets be boring. But if they have it in more of an application, and they put a little graphics to it, then that makes it a little bit more fun for the students.

Moderator: If you were designing the application of this computer lab to your curriculum and you had complete freedom to do that, how would you organize it? How would you utilize it?

Speaker 2: It takes a lot of planning. It really does.

Speaker 3: I think I do it now, but they give you an outline of the different word problems they had and I did do it based on the different areas where we were at. Like in the beginning we were just doing an overall review so they were doing fraction word problems which is on there, and decimal word problems. Then we dot into integers and they do have those in the program. So like I was saying, the first semester, I was able to correlate it.

Now, it's mostly review or something they went over in the first semester. And I try to correlate as close as possible, but a lot of it right now is, well right now I'm having them do percentages, because even though we had percentages first semester, it seems to be the most difficult area for them to learn. So we might be doing something else right now in algebra but it gives them a chance to bring it up and review that knowledge.

Speaker 2: I think the review is excellent. Even though you might be on a different topic, the problem solving can just overflow whatever you do in any area, the problem solving. It depends on who your class is and what you're doing. The review can usually be tied into it.

Speaker 1: And you asked if we can design the software ourselves?

Moderator: No, just the applications.

Speaker 2: If we could design it to be correlated. That would take a lot of planning because you have to see the overall picture and then be able to go through the problems and then somebody knew exactly what you're teaching like that.

Speaker 1: We would need time to go through the problems themselves so that we would know where they would best fit in and to be sure all the material would be covered. We wouldn't be introducing anything new. That would be the best ways I could see. If the application . . . Because once the students do those word problems, that application is so important. They don't want to read this paper, sheet of paper full of word problems, that's not going to work. But they can sit in lab and just keep reading the word problems if they would apply them.

Moderator: You talked about students, so let's kind of move into that area. What type of student benefits most from these kinds of instruction?

Speaker 3: My observation this year had, I snuck my full-year algebra in, as well as my algebra part one. And I really think my full-year algebra appreciates it more and is getting a better benefit from it than the part one students. They just got into it. The part one is, they're taking algebra for two years, and the regular algebra has algebra just for a year's time, you know, the regular algebra students. And the part one would be like the intro to algebra students that they're doing. I wanted to see if it did make a difference. And they

were working on one problem, and the way they have it set up now they're talking about one person, and the person does this and does that, and you could just hear the kids say, "Hey is he crazy. Is he crazy? He's spending all this money on this chocolate." And they really got into it. But the part one students, they could have cared less. They just wanted to know, "How many problems do we have to do today?" They just wanted to go and get it done and over with. Whereas the full-year I'd give them X number of problems that they must do to get credit for the lab they always go beyond what they have to do. They get to the next level, and they'd say, "Hey, I'm on this level." So to me, they enjoy it more, and utilize is, and have gotten something out of it. Whereas it was designed for the part one students.

Speaker 1: So what you're saying is that the students who have a little bit more background, more of math, is it maturity?

Speaker 3: It's not maturity.

Speaker 1: Because the first year algebra, whole year, are a little bit more advanced in math skills. They're a little bit more proficient.

Speaker 3: Whereas the other ones, it's supposed to motivate them, and they don't get excited.

Speaker 2: Therefore their reading skills are probably better.

Speaker 3: With the algebra one students.

Speaker 2: Was your question what type student benefit better?

Moderator: What student can benefit most?

Speaker 1: My students benefit. Some students, I had this girl, who once, she saw really came to see she could get the work done, learned the lab, she really took off in the lab. And she transferred that over into the classroom, and she started working well. I'm not saying that she learned everything. But now, I think she's working just as well in the next level. I don't have her anymore but they just turned her on. She did more work and she tried more problems. And that was her biggest problem, she wouldn't finish anything.

And by her being absent, she never really got the full benefit of the lab. But the time she finally got in and started coming consistently, she, her work was better in the lab and in the classroom. And her increase sort of sparked somebody else because they knew how she was in class, so that made them look. It really did. It made a difference in attitude for some of them. And some, as she said, some of it with the reading skills.

Speaker 2: I found that students who are competitive, they did really well. They wanted to do as many problems as they could possibly do. So, I'm saying, many of the students that were competitive by nature, they tended to do well because they wanted to complete a problem and move on to the next one. And what we did, we had our own ways of bringing recognition to those who were doing problems, maybe so many problems in one class session. Also, I was surprised several times with seemingly not the best or most desirable students in the classroom, some of them really did well in the lab. As Mrs. Brown said, some of them had attendance problems, when they were here on the day we had the lab, that seemed like that made a positive, it was an influence on them to come, and once they were here, they really were turned on by the fact that they were doing something. And they did better on the computer than they did with a piece of paper and a pencil in the classroom. So I think as a result even if they weren't doing a lot of problems they were putting forth the effort. So, I think that's notable in certain students.

Moderator: They were engaged.

Speaker 2: Exactly. And it wasn't, I would observe them the best I could, and they weren't just pretending to push certain buttons; they were actually working the problems.

Speaker 1: And some of the students need that pat on the back that you can't give every time they complete a problem. But with that software we had last year, that pat on the back came as soon as they did something right, they saw they were praised for that by the computers. In turn there were some of those that got frustrated quickly because they couldn't reach the end of the problem or to the standards of what they felt. They may have finally worked the problem out, but it was too long. They felt like they should have been able to do it quicker. But I don't think they had the skills or the patience to really understand the process of what each step was to entail. So those students were really frustrated, they didn't like coming to the lab at all.

Speaker 2: Some of mine who were frustrated and had to wait that long to get the answer, it was because their hand might be up and I might be doing something else. So that contributed to the frustration, because I just could not get to them soon enough for them to go on. So in essence, I was holding them up. Not intentionally, but because someone else was demanding my time. So I found that to be, at the beginning especially, part of the, to some of them, it was just stressful maybe to come there

Speaker 3: I noticed that the students who had been exposed to computers in intermediate of elementary school, they also do better, and are comfortable with it, versus those who came here for the first time.

Moderator: That student who was having trouble with the proficiency test, you mentioned something about that, is this program beneficial to that person? Was tutoring more beneficial, or is it individual? Depends on the individual?

Speaker 3: Depends on the individual. But I don't know what the results are, as far as proficiency. We won't get those back til August. But I could see the lab being used to work individually with the student for the proficiency. With the lab tech, or the teacher, or the coordinator, if they had a question.

Speaker 2: The geometry you said, it would be beneficial.

Speaker 3: Or with fractions, or even algebra it could be beneficial.

Speaker 1: Because proficiency tests are a lot of reading. Even though it's the basic skills they still have to read it. And this would give them more practice.

Moderator: The data that you received from the printouts, how does that facilitate your use of the program or student learning.

Speaker 3: It let's me know how many problems they've done and it actually gives you the listing of number of the problem they've completed, and it lets you know the difficulty. It lets you know how many times they had to get help from the tutorial, so that gives you an idea if they had to the tutorial more than three times they don't have a full understanding of it, so maybe you need to go back in and teach this again.

Speaker 2: I think the notebook portion is worth mentioning, too. They had a notebook in which they made entries. It could be personal, about the classroom, whatever they wanted to put into the notebook. That gave us insight as to our students individually, in terms of character, or maybe their academic achievement. That gave us kind of an inside view of our students that we may not have.

Moderator: There was information you didn't have before.

Speaker: Exactly. Well, more detailed than we might observe. It would have taken a while to observe it, but to have it there in print. It just gave us a little more so we could really use it to reach our students.

Moderator: What, and this the last question, what criteria would you use if you were to make a recommendation to the board of education and you didn't have this beautiful lab. To you spend the money on a lab and use this in the curriculum? What criteria would you use to make that recommendation?

Speaker 2: It might improve attendance. That's an ongoing problem, so I think that should be a high priority -- improving their attendance rate. I did find with certain students, it did improve their attendance rate. I think, I feel it did improve their attendance rate. At least they felt that school was maybe worth coming to. If that's their reason, then, let's at least start with something positive. Once they're here, they'll see there's something else to school than just this. But at least it's something to get their attention. Something to make them feel positive about school.

Speaker 1: And with the increasing need for the math and science skills to be higher, this could be a way a teacher could use this in that sense, to review. Also to influence what they're teaching in a classroom in a different mode so that it would become, keep the students interested in what they're learning. And with our district the students need algebra one to graduate and that's the first place they have it. This also would allow us to review their basic skills and not do the course in the classroom. So that would be really good for this district. This lab would be good for this district. Not just numbers, because we have software where you do just get the number and go through, but at the same time they're learning the basic skills, they're learning the thinking process of word problems. They have word problems in proficiency tests, they have them in the CAT. They're reinforcement from the classroom, and they review skills they need to know in elementary



or in intermediate they solve, or maybe they have seen and have worked with, maybe it's just not their strongest point, but it's put to them in a different form, instead of just pencil and paper. Because right now in the classroom availability a lot of students don't like all these little puzzles and things. They just don't like it at this level. But this is a more sophisticated level of review instead of just the basic pencil and paper.

Speaker 3: It's an opportunity for the students to come to the twenty-first century. And that's it in a nutshell. They give the teacher classroom instruction, and they're also familiar with the equipment which they will more than likely have to work with when they leave.

Moderator: That's a very good thought to end with. We appreciate your time. We have some soda and cookies, I think, so I hope you'll join us for those.

## Focus Group Transcript

### Trotwood Teachers

5/4/94

Moderator: The first thing that we're interested in is the level of comfort a teacher needs to have about using computers and computer software. So if you can think back as to when you were first introduced to this as to what was your comfort level and what were the contributing factors to increasing that comfort?

Speaker 1: For myself, I don't think I'm really qualified to say because I am pretty computer literate so I was pretty comfortable down in San Antonio. However, if I had not had the chance to go to San Antonio and look at the software and actually play around with the software, it would have been kind of a strain going to the classroom the first day and trying to explain it to the students just from maybe reading the manual or something like that. It's good to have the hands-on prior to going in to it with a new software like that. So, for any suggestions I would make if someone has a piece of software, I strongly suggest that they sit down and work with it and get comfortable with it before they introduce it to their class.

Speaker 2: I'm kind of half-way between them as far as computers because I do work with one at home. But I have yet to learn how to really handle the teacher back-up type stuff -- the curriculum and all that kind of stuff on this one, because I've never really had to sit down and look through it. Finally this year, I'm finally figuring out how to change the courses without having to have the technician do it. As far as handling the program itself with the kids, I haven't had any problem with that. But I agree, you have to have an introduction, it has to have an introduction at least a day's work.

Speaker 3: I'm the one who had not been used to working with computers. And San Antonio work went a little too fast for me because I was a little, I'm familiar with computers, but with my work last year, I feel a lot more comfortable this year in the computer lab. Still a little frustration sometimes when I go by myself and want to get on because of the English program. I don't quite know how to work all the gadgets and so forth -- all the extra things. I sort of rely on the technician to help me. I go in when the technician is there and he can transfer from the English to the math, and then after I get on the math tutor, I'm all right. I feel comfortable then going, as long as I'm in the math tutor.

Speaker 1: I can get in and out of that, but I know how DOS works. People that do not know the system -- DOS and Windows and all of that -- they're going to have a little problem. I'm assuming it's going to be on Windows and not Mac. I don't know. But it was on the MacIntosh it would probably just be a little bit easier. And that depends if you're using it on Mac also.

Speaker 2: I find it hard to turn the system on. I've never figured out how to turn the system on.

Speaker 3: Last year, I could turn it on because it was on the Mac. Now I'm flustered. I do not know how to get the software up.

Moderator: What about training after San Antonio? What kind of training has or could happen now?

Speaker 1: Oh maybe like some type of little in-service before school starts. Our problem was our room wasn't even completed until like October. So as soon as the room was finished, we were able to bring kids. We had to go in on our own pretty much and work with it ourselves. But I think that now the computer lab is ready and ready to go, that maybe there should do some type of in-service prior to school year starting. Because from San Antonio to the time school starts you do forget a lot of things. And people who aren't comfortable with computers maybe even more, or feel they've forgotten more, and feel even more anxious about it.

Speaker 2: It was a lot of time, because we had two months in there before we really got a chance to do anything. And I know I forgot most of what we learned.

Speaker 3: I think maybe an in-service with a technician there to help the teachers that are not as comfortable with it. Because I feel comfortable now asking our two technicians what to do and have them help me. I feel comfortable with the technician. Now, if they take the technicians away from us, I don't think I'll feel as comfortable.

Speaker 1: And then if they take the technicians away, they should definitely make sure the software doesn't have all the bugs that it has. Otherwise we're going to need the technicians there.

Moderator: Has interacting in this program and with this software, has it changed the way that you deal with computers outside the classroom? Have you sought other additional computer classes? Have you bought a computer for yourself?

Speaker 1: I bought a computer this year, took a computer class this year. And only because of finances is the only reason I haven't taken any more. That, working with those computers is really nice, and it kind of swayed me toward buying an IBM-compatible or DOS PC -- that's what I have at home. But we also have a Mac lab, and I'd love to go in there also, but we don't have software because of money, finances in the school district. And we also have an old Apple lab which we did utilize a lot this year. I went in there at least once a week, especially before I started going into the FST lab. Because at the beginning of the year there, it was just English and eventually then they worked Math in. It just took a little while to work us in. But using those computers, I think, it has made me feel a little bit more comfortable, using computers with my classes.

Speaker 2: My husband has computers, my sons majored in computers, we have computers all over our home. I'm the odd-ball. My freshman daughter knows more about them than I do. But I have three IBM computers over in the room now that I brought in -- they're our old personal ones, they're old -- and I had software for them too for use in the classroom. I still am not comfortable figuring out how to handle having one or two computers for a whole class full of kids. That's something that I'm going to ask for -- some guidelines on how to work with a limited number of computers. But I have Mac games that I have accumulated that are not available for use on the Apples we use.

Speaker 3: Now I have no computers at home. But I have used the Apple lab here. I've taken my classes down to the Apple lab, some but not probably not quite as much as Stacey has. But I've been going in to the FST lab every week almost. I've probably gone in there more than they have.

Moderator: Good. Let's take a look at something else.

Speaker 2: I'd like to say one thing. The reason I'm doing the computers over there is not so much because of what I've learned from the FAST lab is that I've realized there is software available for kids. I wouldn't say that it definitely made any influence on the having a computer in my room. But I am using it more now than I did. Then I didn't have any software.

Moderator: Good. What types of support do you think you as a teacher or a new teacher who's going into this, what types of support would they need to be successful? In other words, what types of support from the administration? Let's start with the administration first.

Speaker 2: One of the things that I find very helpful in support right now is that if you have a kid that absolutely will not behave in class, the administration is willing to take them out and make sure they stay out of the lab. I have that every once in a while. Outside of some financial support.

Speaker 1: Well, I think they should support the teachers to have some time off to do an in-service, something like that. We haven't asked for that, so I don't know if they'll do that for us or not. I know that we did have in-services for the rest of the department outside of the FST lab that they did pay for over the summer. So I would assume that if we wanted to come in and work on a lab or different piece of software, that the administration would support that. And that's something I think that the teachers would need is to be able to have that time for the in-service. Other than that, there's really not much they can do for me, other than money.

Moderator: Money's important. Can you think of anything?

Speaker 3: They were willing to take this room and fix it up. They put in some money into the paint and the carpet and so forth, which I think is supporting us. It made a very pleasant environment for us to be in. I mean, it's a nice looking environment. It's a little crowded, I think, maybe the computers need to be spread out a little bit, but.

Speaker 2: Along with a the money line, I do think a tech person is almost essential.

Speaker 3: If down the road, they would, when the education foundation maybe pulls out after their four years -- or what is it, three or four years -- will we have a tech person? Will our school support a tech person? That might be a financial obligation for the school down the road down the road.

Speaker 2: Or if not a tech person at least, I think two people in the lab is almost essential. Kids have questions, and you can't get around to all of them.

Speaker 3: If it's filled up, yes. If you have 25 in there.

Speaker 2: If you have 25 in the class, it's hard to get around and get it. And they get very frustrated when the computer will not do what they think it ought to be doing. And you have to get around and help with it.

Speaker: And I've talked to other people in our district, and I don't remember what district specifically, but this particular teacher was telling me about they have a computer person who is in the computer lab all day. And if the teacher wants to bring a class in, not only is the teacher there but also the computer person there. The district pays for that particular person to be there all day. So that's something that administration as far as support that's very central, I think.

Moderator: Does that person have to be a teacher?

Speaker 1: No because this technician here is not a teacher, and he's very much appreciated.

Speaker 3: He helps, too. At least when I'm in there, they come around and help the students. They really are a good aid.

Speaker 1: Just when there's a problem with just the software. Or a student gets somewhere where you're not quite sure how they got there, and you're not quite sure how to get them back. You don't have to worry about that. You don't have 50 other kids waiting around with their hand up trying to get you to come over to help them while you're trying to get this person back into the program.

Moderator: So you would say this is a very labor-intensive effort? Individual attention, labor?

Speaker 2: You would think that because it's computer-guided, it would not be so teacher-needed, but it is.

Speaker 3: And even when they go to the help and hints and so forth, it says "Ask your teacher."

Speaker 1: And that's in the software, that gets down to the software part.

Speaker 3: But that's why we have some many students say, "Well, it says get help from the teacher." So, spread yourself around.

Speaker 1: There are a lot of things in the software that cause the students to ask you. I mean, I could go on and on about it, but.

Speaker 2: I mean, a lot of the kids simply don't want to keep going up and getting help, getting hints because they know that if they do too far, they'll have to go back and do the problem over again. But the first few hints aren't helpful.

Moderator: Could this technician or aid you, could this be a parent-volunteer? Could this be another student?

Speaker 3: I was going to mention that, because I think at one time, we were asked if it would be possible maybe to have some students who were very proficient on the computer come in and help us, but we never followed up on it. It was mentioned to me, I think, by Mr. Sterner, at one time, if we would be willing to take some students in, but nothing was, we didn't go any further than that, except to mention the fact that we could possibly get some top-notch computer students to come in and help us.

Speaker 1: But even at that, those students would have to be tutored on the, at least the mechanics of the software.

Speaker 2: I'm leery of volunteers for the simple reason that someone would have to be dependably there, and volunteers I don't think that you can depend on that well.

Speaker 1: If a student's absent, there's your volunteer.

Speaker 2: I think it needs to be a paid position. Not necessarily a teacher, but at least a technician or somebody that's knowledgeable and can work with students. Or a teacher's aid-type position.

Moderator: Well, you talked a little bit about training, and you indicated that you felt the training in San Antonio was critical. And you indicated, I think, that training should be ongoing. What type of training do you think would be the best for you, and how much?

Speaker 2: I've had student-teachers, observers come in, just to come in and walk around and watch and see what's going on, and just some of them will sit down and try the problems and work them out and figure out what's going on and catch on right away. Others will just walk around and watch the kids working, and ask the kids questions on how it works, and they catch on to it very quickly as far as learning how to handle the problems and the particular manipulations you have to do with the screen. They catch on to that pretty quickly. I think the training you need to do is learning how to handle change the problem, things I'm still shaky on. How to change the curriculum, how to put names in and ID numbers and all the little technical stuff. As far as the hands on working the problems that just takes a couple of hours to do that.

Speaker 1: I think there needs to be a little more hands on with other aspects of the software, the teacher aspects of the software: getting in to the curriculum, changing the curriculum, changing the names, to add new names, taking out old names. Once you get into it and start doing it, it's very easy -- it's just that if you don't, if you haven't had the chance to do that. So they definitely need that chance to do that prior to going into the software.

Speaker 3: I would have been more comfortable if I had some time before school started to do some of those things.

Speaker 2: And to pull records. I've never pulled records. I don't know how to pull records. The technician always does that for me.

Speaker 3: I wrote that in. The fact that the technician has always generated my reports for me. I have no idea how it is done.

Speaker 2: I like the things they have now -- the problems accomplished during the day -- they have at the top of the screen. So before they log off, I go around and record that, so I know how many problems they've worked so I don't have to take it off the records. That way the kids know that I'm recording it, and they realize how many they've done. And I do that more for that reason.



Speaker 3: I get a printout after every class that's been in there and the students can see. But I don't know how to do that. I haven't been trained.

Speaker 2: That's the kind of stuff that needs to be in a manual.

Speaker 1: Especially if you're not, they're not going to provide us a technician.

Moderator: Very good, that's exactly the next question I wanted to ask you about -- manuals, documentation -- how important are these?

Speaker 2: I think without a technician, you have to have a manual, and it's going to have to be somebody who knows a little bit more about than what computers than I do.

Speaker 1: Do not give me a manual and expect me to work the software. I'd rather just sit there in front of the software and fool around and stumble over everything first before I read the manual.

Speaker 2: My husband says, "Well, just read the manual; it tells you how to do it," and I said, "I can't figure out the manual. It's usually in Greek. I can't understand it." Of it's in Japanese that's been translated into English. But you need a step-by-step guide. My idea of a manual is a file card that's a 1, 2, 3 -- you do this, then you do this, then you do this, and this is your result. I can do that. When I lose my card, I'm lost.

Speaker 3: Well, I would appreciate having a list of the problems, myself, because this helps me to prepare on what level, you know, or what to put together.

Speaker 2: Or if somebody has got absolutely stuck on a problem and you can't figure out what's going on, you can go back to the problems and look it up and see what on earth the computer is asking for.

Speaker 3: So I think we need a manual of all the problems.

Speaker 1: Another thing that I that I see, the DOS -- that's a big problem. That's a problem that she's having, that's a problem she'll probably have as far as setting up the system. Teachers do not know anything about the operating system, and they need a little

bit of that. Just enough to know that when the screen goes black, you haven't lost anything, you don't have to panic.

Speaker 2: See, we panic. There's a problem; the screen goes blank; what do we do?

Speaker 1: Sometimes the kids just do something, to purposefully. They get out of the system, and they can't get back in it. And they panic, and then sometimes the teacher panics, "What happened?" But it's just a simple thing about getting back into Windows, but if you don't know that, then I think just a little, simple, not necessarily a 10-week course on DOS, but something simple

Speaker 3: One day would help us.

Speaker 2: It would probably help having a check list saying, "If your screen goes blank, do this."

Speaker 1: Yes, sort of like, what do you call that?

Speaker 2: Troubleshooters.

Speaker 1: Yes, troubleshooters.

Speaker 3: Troubleshooting, that's what we need. Because I would not survive if it wasn't for that.

Speaker 1: Maybe a little manual on that. I don't know

Moderator: Let's change the topic a little bit, and take a look at classroom organization and integration of software and curriculum. Specifically, what's the relationship between the FST software and your classroom objectives or your district objectives?

Speaker 1: A lot better this year than it was last year. There was a lot more margin in the problems than last year, so that I was able to correlate a little, a little, especially in my workshop classes more than in my algebra classes. But it was a little easier to correlate that with my curriculum. When I was working fractions, I could go over there and work on fraction problems. When I was doing percents, I could go over there and do percent

problems. Or when we were doing, you know just anything, I could go over there. The algebra was a little more difficult.

Speaker 2: For a little while, while we were doing areas and volumes.

Speaker 1: And integers.

Speaker 3: And if we had gotten started at the beginning of the year, I would have gotten more use out of the fractions and decimals. But we didn't get started until after school was underway for two or three months, and they had already taken their proficiency tests. But I certainly could coordinate with my workshops.

Speaker 1: It was easier to do with the workshops.

Speaker 3: I moved right along with the workshops.

Moderator: You used the term 'workshop' more than once. What does that mean?

Speaker 2: Ok. That is the class were the kids who have not passed the math proficiency test. We have a ninth-grade workshop for the kids coming in with CAT scores, stay nines, of three or below. They are automatically placed in the math workshop. And the kids who have not passed the math proficiency in their freshman year, they are placed automatically into a workshop, 10 through 12.

Speaker 3: Kind of like a pre-algebra course.

Speaker 2: The state allows them to take one intervention, one credit of math intervention for math credit in high school. And if they don't pass the workshop this year, or proficiency this year first year, they are scheduled back in the workshop next year.

Speaker 3: And our understanding at the beginning of this program last year was that this program was basically for what we call pre-algebra students. That was our understanding.

Speaker 1: We are not quite agreeing with that at this point by looking at some of the problems. But that's the software.

Moderator: You can talk about software.

Speaker 2: Did that answer your question?

Moderator: You did a good job.

Speaker 2: If you're talking about the tying in with the problems. The algebra class is an accredited algebra class even though it's a basic algebra course. It's still hard to tie in the curriculum in there.

Moderator: A related question would be, and you talked about the math proficiency test, how closely related is the math proficiency expectations and the software?

Speaker 1: I think the software is a lot more difficult than the proficiency test. Not so much that the concepts are harder or higher level, or anything like that. It's just that the problems are more, made much more complicated.

Speaker 3: Hidden. A lot of hidden information.

Speaker 1: With all the words, and all the unnecessary things. I have a feeling that they're trying to trick the kids sometimes over there with that software. They're adding things that are completely and utterly useless, and to me, that's not really testing, well I guess that's what they're trying to do it test, but that's not really actually testing the student's ability to do the problem by throwing in all that other garbage.

Speaker 3: And a lot more complex than what's on the proficiency. A lot more wordy.

Speaker 1: A lot more complex than I would assign them.

Moderator: What about the math authoring component of the software?

Speaker 3: What are you saying? What do mean by the 'authoring' component?

Moderator: Where they can write their own problems.

Speaker 1: We didn't know we could do that.

Speaker 2: I'd love to be able to do that.

Speaker 1: I know you can go in and change problems.

Speaker 3: It was mentioned that there might come a day down the road that we could do it.

Speaker 1: I know you can go in and change problems, but I don't know how to do that. The technician does that.

Moderator: Let's just ask the question would that be a good feature?

Speaker 1: Yes.

Speaker 2: I would like to have problems that have more to deal with our math proficiency test, that they could keep working on that type rather than such hard ones. Some of the problems are good, but the equations are so long that's the equation they expect them to do.

Speaker 1: And I'm wondering, are these really supposed to be for pre-algebra, basic-level students when you have multiple parentheses equations? I have to wonder.

Moderator: It's beyond the expectation of your curriculum, is what you're saying.

Speaker 1: Some of it.

Speaker 2: The first couple levels. It gets real simple, like writing equations, you'll have " $x = 4$ " or something like that. That's it.

Speaker 1: It goes from extremely simple to extremely hard pretty fast.

Speaker 2: They have some of the, I didn't really expect it or not because I didn't try it this year, but they had volume problems changing from centimeters to inches and back and forth in the same problem and things like that. And they're not asked to do that.

Speaker 1: Not on the proficiency.

Speaker 2: I would like to see things like changing the units in the English system. That's the type of problems we do have on the proficiency.

Speaker 3: There's just a very few of those. There could be more, more practice on there.

Moderator: New topic: student motivation. Would you, what observations have you made about student motivation within the computer lab?

Speaker 1: Some of them love it, some of them don't.

Speaker 3: Surprisingly. I had a majority that look forward to it. They asked, "When are we going to go to lab again?" Now, of course, out of every class you maybe have two or three that don't want to go. But the majority do want to go.

Speaker 2: I had one boy who was failing in class, I don't think he's passed anything in the workshop second semester. In the computer lab, he's getting six or more problems a day done. I expected him to do three. He's working completely on his own, he's getting them right, and he's going to town, he loves it. Never opens his mouth or anything. He's doing great. And I have other kids that are fairly good students in class that cannot figure that computer through at all, and they're only getting one or two problems done.. Or don't get any done.

Speaker 1: But that doesn't mean they don't like it. Because a lot of them come in, "When are we going to computer? When are we going to computer lab next?" Some of them do. They like going.

Speaker 2: They like coming over. They like coming over, and they like the fact that it's air-conditioned in there. The change of pace.

Speaker 3: Now those are conditions, those are environment. They like the air conditioning, they like the little spots.

Moderator: New carpet.

Speaker 2: Yes, they don't like going to the Apple lab because the lights don't dim. That's what somebody told me today.

Speaker: Like I said, some of them like it, some of them don't. I would say that most of them like it.

Moderator: You eluded to student and teacher interaction. Let's investigate that a little bit more. Do you feel more involved with the students there, or is more time required? How does that interaction take place?

Speaker 2: I had made the comment a couple times when I go back to the other building at the end of day. I have four periods straight in the lab, I said, "This is more work than teaching regular classes," because some of the kids will not use the computer help. They still have the hand up wanting help. And you say, "Go to your helps. Use the helps", and they say, "But it won't tell me anything." And then I have to go get them one for making equations so they can go to get the help they need.

Speaker 1: That the problem. The kids don't realize that the computer can only help them with what the computer thinks they're asking for help for. If they're not in "make equation." I'm assuming you're familiar with the software?

Moderator: Somewhat. Not very much.

Speaker 1: Well, if they're not in "make equation", the computer will not help them to make the equation. The computer is trying to help them to go select, make equation. So therefore, it says, "Ask your teacher" because it's saying, "Hey, I don't know how else to tell you to go up the top and push 'make equation.'"

Speaker 2: Or they'll have everything right, the number part of their answer is right, and they don't have the units right, and the computer won't accept it, and doesn't say, "Your units are wrong." It doesn't give them any help.

Speaker 3: Oh, sometimes it says, it's just a matter of adding an s or deleting an s off the unit, too. Is that dollar or dollars? And kids get very frustrated with the computer. You know, I've got the right answer, I've got it labeled. That goes back to the software.

Speaker 2: I had a one girl that was really mad one day, I had a couple girls who were so made because I wouldn't help them. Well, one day I was introducing about 10 new kids to the lab and she didn't get the help she needed because I had to work with the new kids

coming in. Another girl was on the far side, and I never got over there. I spent the whole time in the middle aisle, and I never got to her part of the lab. You neglect them. That's why I think there ought to be two people in the lab. Or maybe it's our arrangement, that you just can't easily get around either.

Speaker 1: It isn't.

Speaker 3: It's a little crowded.

Speaker 2: Next year, I'm supposed to be teaching a class that has LD students that might be included in the program and there will be two of us in the room. I looking forward to using the lab because there will be two teachers in there that can work with them and I think it will be very helpful.

Speaker 1: It's nice when a technician helps out.

Speaker 3: Comes out and helps. It really is.

Speaker 2: A lot of time, he doesn't for me, and I don't know why. When I call for him, he comes to help a little bit.

Moderator: You kind of eluded to this, because you said some do better than others, but what type of student benefits best from this software?

Speaker 2: I'm surprised at some of the results.

Speaker 1: Average.

Speaker 3: Average and below average sometimes in my class.

Speaker 2: It depends on hard the problems are. Some of the problems that are more than one window long, the below average ones don't ever read through it. They have to be able to read.



Speaker 3: Non-readers have a very difficult time. If they are not a reader. Now, the graphics sometimes help those students out some, I think, when they could look at the pictures.

Speaker 1: When the graphics are correct.

Speaker 3: Yes, and when there is a picture. One of my problems today, it said, "Go to the picture," and the kids went to picture and there was blank. And I said, "That was a goof. Just don't worry about the picture." But I would say the non-readers got help from the graphics.

Speaker 1: Last year, I would say that my pre-algebra kids did better in that class. Well, that's all I had in there. I had pre-algebra kids in there.

Speaker 2: I had both pre-algebra and tenth-grade general math students. And my tenth-grade general math students didn't do as well as my pre-algebra students.

Speaker 1: Well this year, I had to chance of having my workshop and my pre-algebra students in there. And I would say that my strong pre-algebra class did well, did better than my weaker pre-algebra class. And my stronger workshop class did better than my weaker workshop class. And I would say that they, the kids that were stronger in here were stronger over there.

Moderator: The last question, the one we've all been looking for. I want you to do a little dreaming here. If you had complete freedom and without regard to money, how would you organize your class and the computer labs? Would you have a separate lab set up like you have now? Would you have the computers in your classroom? What do you think would be the best organizational structure?

Speaker 1: I would put a door right there that would go right next door.

Speaker 3: She's lucky because she's right next door to it.

Speaker 2: I'm over there.

Speaker 1: I'd like a door right there.

Speaker 3: It would be nice to have it right connecting, because I would trust some of my students to go in on their own and work, and then I could work with the others that maybe needed more individual help. Especially my algebra class, because I sent them there one day on their own, and they went in, all logged on. I went there and they were all busy working. I can't do it with my workshop, but I can do it with my algebra group.

Speaker 1: I think the technician is essential. And I wish our room was bigger, if I could knock down a wall and stretch it out and all of that.

Speaker 3: Possibly the computers would be set a little further apart, so they're not quite so close.

Speaker 1: And if I had control over class size, I would shrink my class size.

Speaker 2: 25 is really too big. I know the Air Force said they wanted 25 in there, but.

Speaker 3: Under 20?

Speaker 2: Under 20 works well. Because last year all I had.

Speaker 3: Now some of mine are under 20, and I still struggle with a couple classes.

Speaker 2: I would say also an aid of some sort besides the technician I really think that would be helpful.

Speaker 1: An aid/technician.

Speaker 2: I think I would personally prefer to stick more with the workshop classes and not necessarily. I didn't have any freshmen, you tried freshmen in there last year, didn't you?

Speaker 3: I had freshmen workshop in last year.

Speaker 2: I think that workshop classes would do better than the algebra for the simple reason that you can't tie algebra that too much to it.

Speaker 3: You can tie quite a bit.

Speaker 1: Which would change if we were able to put our problems on or if they're going to add more subject matter to the software, anything can happen.

Speaker 2: Of course our practical algebra course doesn't do that much in the way of solving word problems.

Speaker 1: No but, there's some make-ups. There's always make-ups.

Speaker 3: That's what they need.

Speaker 2: Or else have it so it could be used straight for proficiency, so that we could use that as for our proficiency intervention. That's what I'd like to see. Is to work closely with geared to what our proficiency test is.

Speaker 1: I'd have a better screen. That's a terrible screen.

Moderator: Are you talking about the overhead screen?

Speaker 3: I really haven't gotten much use of the teacher's.

Speaker 1: Right. Where it's located, and it's hard to see everywhere.

Speaker 2: If we haven't had that whole corner cut out so for the lab's corner, we could have had more room in there, and that would have helped a little bit.

Speaker 3: Because Dunbar has a lot more room in there, they have a nice size lab. Theirs just looks like so much space, and their tech is out, outside of it. It's much bigger and it just looks like it's opened up. It might mean more walking for the teacher, but.

Speaker 1: Easier to get around in.

Moderator: Well, we want to thank you for your time, you did an excellent job. I know it took some time out of your hide, and we appreciate it, and hope you'll enjoy a cookie and some soda.

## Focus Group Transcript

### Trotwood Students

5/11/94

Moderator: Is everyone comfortable? Do you think you know what we want to do? Feel free to talk. We want to, when someone says something, if you think of something that would reinforce what that person says then you can chime in and talk about it. You don't have to take turns. Just whenever someone wants to say something, then they can say something.

Speaker: Is this going to last all period?

Moderator: It will probably only take about 15 or 20 minutes. We'll try and get you out of here -- I have about 15 til 10 -- we'll try and get you out by five after. Ok? First question, we're interested in knowing what kinds of experiences that you had with computers before you went into the laboratory. Were you familiar with the use of a computer? Had you had the chance to use a computer before?

Speaker 3: Yes, I did. I did. When, I started using a computer when I was in elementary, I think I was in sixth grade. We were using Apple computers. And then when I went to junior high, we used IBM. But I haven't ever used a computer like that before I got to Cambridge.

Speaker 2: This is the first time I ever used an IBM-type computer, too.

Moderator: In this laboratory.

Speaker 4: I've only been using Apple computers

Moderator: But you had used a computer program before?

Speaker 3: You used computers here?

Speaker 6: Yes. Well, I started using computers when I went to first grade. That was Apple first, when I was in first grade. When I was in my freshman year, I had with the

computers, and I had word processing. Something else, last year, I had some other computer class. It was learning to type on the computer.

Moderator: So, you've had several different types of experiences with computers?

Speaker 6: Yes.

Speaker 4: I have too, but this year, I've never used a computer like the kind.

Speaker 6: I never used a mouse.

Speaker 4: But we mostly used them in English classes, for papers and stuff like that.

Moderator: Word processing programs.

Speaker 3: Some of these classes in junior high, but it was a typing class, and when we used computers, used to have to use -- I haven't ever used a mouse to take me through anything like I do in here. It different. I had a partner and I to draw without lifting the mouse up. I had to draw with the mouse the best that I could. But as far as taking me through stuff clicking on the mouse to help me through, I never did use it like that.

Speaker 1: The first time I used the mouse in computer was in a MacIntosh computer in seventh grade, in a computer class in junior high.

Moderator: So, generally, you've had some experience with it. Let me ask one other question related to that. In your current coursework that you're taking, do you use computers in any other class?

Speaker 5: Reading.

Moderator: Reading class.

Speaker 4: English.

Speaker 2: English. But not as regularly as what we use those.

Moderator: And how often do you use the computers now in the computer lab?

Speaker 2: We go once a week.

Speaker 3: We go once a week too.

Speaker 5: We go every other week.

Moderator: So it's fairly regular. Ok, let's take a look at this a little bit differently. How comfortable were you with the use of computers before you went into the lab, and has that changed? Do you feel more comfortable with computers now?

Speaker 5: I know I do.

Speaker 3: It was that particular computer. I had to get used to it because it was different.

Speaker 2: Until, the Windows and stuff is a lot harder than the Macs to get used to and stuff. And to learn the proper techniques of doing the word problem felt kind of hard at first before I knew how to do it?

Moderator: The actual sequencing of the problems was a little bit difficult?

Speaker 6: I just had to get used to using the mouse. I'm used to typing everything in. Instead of clicking it up.

Speaker 3: Yes, because with that mouse, you can put the cursor right over the word, and click on it and it will appear.

Speaker 6: I don't like it. I'd rather type it myself. Because I'm used to that. I'm used to just typing it in myself.

Speaker 3: The mouse is very convenient because I'm very lazy.

Speaker 4: I don't like computers, period, really. But it wasn't about me feeling uncomfortable or anything like that, I just didn't.

Moderator: Anybody else?

Speaker 1: It was all right.

Moderator: Let me ask the question a little more directly. Are you more comfortable with computer technology now as a result of this project?

Speaker 2: I am, just learned more about the DOS program and stuff like that.

Moderator: Do you think that you were properly trained on how to use the machines?

Speaker 5: I didn't really understand it at first.

Speaker 2: The guy in here doesn't really like to. He's too busy reading. He doesn't really get around. He only helps if he really has to.

Speaker 3: We need the man from last year who introduced me -- Mr. Stedman -- he taught me how to use the computer. The only thing about it was, when I was having trouble doing a problem instead of him explaining, he'd used to just grab my mouse and do it for me. And I still didn't really get too much understanding. My teacher, she's attitudish when I ask for help sometimes too, but Mr. Stedman, he helped the most, but he's not here anymore. The other man he does, he even teaches you how to use the computer wrong.

Speaker 4: He does!

Speaker 3: Yesterday, I was doing a problem, and I had just got off one and was going to the next one, and this guy sitting next to me, and he had his hand up for help. And our teacher always tells us to do our own work, so it's not like I can help him. I might sneaky help him sometimes, but the teacher came over, and it was just straight, it was just parenthesis and multiplication, and he had him dividing and everything else. He had made about four of five equations and still kept getting an incorrect answer. And I told him and the teacher how to do the problem, because I don't know if he understands anything. And then he try to get attitude, because he told me I wasn't doing it right. But when the answer popped in there correct, he didn't apologize or anything, he just walked away. I think he was kind of upset.

Speaker 4: It wasn't hard to learn how to use them, I don't think so. But as far as that man in there, every time he helps me, he gives me the wrong answer.

Speaker 3: He doesn't know how to use the computer.

Speaker 4: I don't ask him. Now my teacher, she's really helpful. She helps me and everything. But as far as the helpers in there who are supposed to assist her or she's assisting them, however it works, they don't do much of anything.

Speaker 3: My teacher always says, "Get a hint. Get a hint." You go get a hint so much, they can only tell you so much in the hint and then, it's like if you get so many of them, they'll make you do the whole problem over again.

Speaker 6: We showed Derick how to do that and he went in there. He kept getting hints we kept saying, "Go to hint," and he kept saying, "No, I can do it." And they made him do the whole problem over.

Speaker 3: They make you do the whole problem over again. Once you get so many hints, they make you do the whole problem over again. And then when they give you the hint that pops up and says, "Ask your teacher," my teacher tells me to get another hint.

Moderator: Again, focus on the training aspect. Do you feel like you were adequately trained to use the software?

Group: Yes.

Moderator: You feel ok about that. Anybody else?

Speaker 2: Well, I think it would be easier to do if the teacher showed you more instead of just trying to read like the computer says. Because I think that's how it was at the beginning of the year.

Moderator: You would prefer to have a demonstration?

Speaker 3: We used to get demonstrations, like last year when we first got it, Mr. Stedman would cut the lights down low and turn the overhead on, and show us what we were going



to do on the board before we went in with the computer. But this year, it's like they don't even do it, and it's new programs. It's not like we're working with the same programs we did last year.

Speaker 2: They just make you read.

Speaker 3: Yes. Read it. Do it. Read it. It's like we didn't build this program.

Moderator: Anyone else want to comment on the training? Anybody else? What about keyboarding skills? Are you proficient typists? Is it important to be a good typist to do this program?

Speaker 3: No, because of the mouse.

Speaker 4: The mouse does everything.

Speaker 3: The mouse, it's like the keyboard is right here but you very seldom use it, except when you first go in. That's when you put your name and your code name. You might hit the 'enter' button a couple times, but the mouse is right there, you just do everything with the mouse.

Speaker 2: As far as the writing part goes, I don't know, I never did the writing part.

Speaker 3: Except for at the end when you get ready to close and they have you write in your notebook, that's the only time you're really even typing.

Moderator: You touched on this a little briefly and we're coming back to it, is in-class assistance. How important is that kind of help, and what kind of help would you prefer to get?

Speaker 5: I think we should get one-on-one help, and be able to help your peers that are in the classroom with you. Because when I was in there a couple weeks ago.

Moderator: Say that again -- you think you should be able to help your peers.

Speaker 5: Yes.

Speaker 3: Because you understand your peer more than you would your teacher. One person can grasp the concept the teacher's saying but if she doesn't understand what the teacher's saying, maybe I can tell it to her to make her understand. They don't want you to help. We don't give answers all the time. I know a lot of us got a bad habit of saying, "What's the answer for so-and-so, so-and-so," but if you really want your friend to understand, then you'll explain so they can understand it.

Speaker 4: The assistant didn't do anything for me except give me the wrong answers. But if one of your class mates.

Moderator: But is it important to have someone, if they did get the right answer?

Speaker 4: Yes. Because if you have -- how many people are in our class, like 20-something people -- one teacher can't get to everybody.

Speaker 6: Can't cover everybody. The thing about that sometimes, she'll get mad if we're helping each other out. She'll think we're talking about other things. Like the person sits next to me, I help him lots of times. I don't give him the answer all the time. I can't give him the answer, the computers don't give you the answer.

Speaker 3: Because with the computer, we don't have to add, subtract, multiply, divide, or anything. We just set up our equation, they do all the math. And they give us the answer and we click on it.

Speaker 6: No, I just help him, tell him how to do it. He don't know.

Speaker 3: They don't want us showing anybody the steps. They figure if you don't know it, then that's.

Speaker 6: Get a hint.

Speaker 3: Yes, get a hint.

Moderator: Would a written manual, in addition to the hints on the screen, if there were some written material that went with the program, would that be helpful?

Speaker 3: That would slow us down. To stop and read would actually slow us down.

Speaker 4: Because every problem is different.

Speaker 5: And we do have a time limit in there, and the teacher expects us to get at least four or five problems done.

Speaker 4: Four problems done.

Speaker 3: And then if we still had to stop and read everything then we wouldn't get it.

Speaker 5: I think it would be helpful, but it would slow us down a lot.

Moderator: Let's change the subject a little bit. How is the, what you're doing in the classroom, how does that relate to what you're doing in the computer lab? How correlated is that?

Speaker 3: It doesn't.

Speaker 2: Whatever we're doing in math, that's what we go to the computer lab and do.

Moderator: So it's directly related?

Speaker 2: For us it usually is.

Speaker 4: For the most part, ours usually is.

Speaker 5: In there we're just mainly working on word problems. And in the classroom we're working on math problems. You know what I'm saying?

Speaker 2: The computer does that.

Moderator: Doing the arithmetic as opposed to.

Speaker 3: Ours is different, too. It's like everything we do in math workshop -- it's not a regular math class, it's a workshop to help us pass the math part of the proficiency test --

so when we're in there we're focused on the problems what's going to help us pass. But when we go to the computer lab, we do word problems. I mean, there's a couple word problems on the proficiency test, but it's not a lot.

Speaker 5: I know what she's saying. I'm in a workshop too.

Moderator: That was my next question -- what is the relationship to the software and the proficiency test or other tests that you take in your system?

Speaker 3: If the proficiency test were all word problems,

Speaker 6: We'd all pass.

Moderator: Any other comments about that?

Speaker 2: Sometimes taking the proficiency is more like algebra. I don't remember it's been a while since I've taken it.

Speaker 3: The math proficiency is part algebra, geometry, and basic math. It's three parts, but they're just mixed up.

Moderator: So in summary, I hear you say that what you're doing in the classroom is reinforced in the computer lab. That's in your case. Anybody else like that?

Speaker 5: Me too.

Moderator: But some of you, it doesn't match real well. Is that right? I also hear you say that the proficiency test has a small portion related to word problems. How do you feel about your ability to take the proficiency test as a result of being in this classroom? Do you think it enhances your ability or is it a waste of time.

Speaker 5: I don't really see what it's supposed to do.

Speaker 6: It's not a waste of time.

Speaker 3: It's good to learn how to do word problems. But it's just not helping when it comes to the proficiency test, it just doesn't help.

Moderator: So it's just not closely related?

Speaker 6: There's probably like three or four word problems on the proficiencies. There's probably not even that many.

Speaker 4: But still in the word problems you do, this is from what I learned, the word problems you do the same stuff you do on the proficiency test. It's just the stuff you do on the proficiency test may not be in word problems, but it's basically when you do word problems is the same problem you'd do on the test, it's just not in a word problem.

Speaker 3: But we don't do geometry or algebra in the word problems.

Speaker 4: We do.

Speaker 3: We don't. Maybe it's our teacher. You know, each teacher has a different lesson plan or something. Because your math workshop is an algebra workshop, right.

Speaker 4: Because everybody in my class, we all passed it.

Speaker 6: No, some people passed.

Speaker 3: I know, got 190-something or better. In or class, no, it was a 191 or better for your class. I got a 190, so I'm still back there. And it's like, I wouldn't call her work we do elementary, because everything we do is not easy, and we do go over algebra and some geometry, but it's not very much.

Moderator: Let's look at another topic. What do you think, is there any difference in the behavior of your peers in the computer lab as opposed to the classroom?

Speaker 3: Yes. Especially ours because I have a class full of clowns. I do -- David Shepherd, Kenny Wagner, Nirvana -- I got all the clowns in my classroom.

Moderator: What difference? What is the difference?

Speaker 3: When we get into lab, it's quiet in there. But the classroom, it's like she can't control her class some days. But they decided they're going to be quiet and work on their own, in here. But if they feel they're going to sit up and talk all period, then that's what they're going to do. But in the lab, it's different. We chew gum in class, she makes us spit it out in lab. You have to respect her for that because we can get points taken off, stuff like that.

Moderator. Ok. How about other people's experiences?

Speaker 5: I sit right between Norvain and Kenny -- the two boys she was talking about. They still clown around a little bit in there, but not as much. They still have their conversations that boys have with me right there in the middle.

Speaker 3: But they accomplish more in that computer lab than they do in the classroom.

Speaker 5: I would agree with that.

Speaker 4: In our class, I don't think it's different. Because our teacher, she does not play, she's kind of strict.

Speaker 6: When she says, "Be quiet," you be quiet, and that's it.

Speaker 4: So there's no change at all.

Speaker 6: I mean, she lets us talk a little bit.

Speaker 3: My teacher has to threaten our students, with the clipboard deducting points. That's the only way she'll get them quiet. At first they didn't even care, you know, "Who cares about points?" But then they saw what those points were doing to their grade, and every time she'd pick up that pink clipboard, everybody would be like, "Shhh, Shhh."

Moderator: Ok. What about your perceptions?

Speaker 1: They still talk sometimes in our class, but she'll probably tell them to get out our something. And they get out.

Speaker 2: We have some jokers in our class, too. But I think the main problem we have is they like to, not really talk, but like snoop around on the computer and see what they can find. Like get into the games or something like that.

Speaker 1: Learn the games.

Speaker 5: We have games?

Speaker 2: Yes. Press 'alternate escape.'

Speaker 1: Yes, or they close the computer and go to something else to change all the problems around.

Moderator: So that is a negative behavior in the computer lab. What about the, do you find students are more likely to be in class on the days they go to the computer room, as opposed to the days they're in the classroom? Does it affect attendance in any way?

Group: No.

Moderator: If you're going to be gone, you're going to be gone.

Speaker 2: A lot of people in my particular class like to go, because they're always asking. I don't know about yours. I myself enjoy going.

Speaker 1: Sorry.

Moderator: We'd like to have, we're about at the end of our time, so I'd like each one of you to say what about the system you would change if you could change it right now.

Speaker 2: I did review problems where you have to name the question they're asking, identify the goal, or something like that. And the goal they wanted me to identify was different than what it was in the paragraph, and they were wanting.

Moderator: So there are a lot of glitches in the software?

Speaker 2: Yes. Yesterday, I think I only got three problems done, when I normally get 12 done.

Moderator: Instead of the actual software itself, let's think about the classroom and the computer.

Speaker 1: Change the help.

Moderator: You'd change the help.

Speaker 1: Yes, because my teacher.

Moderator: What kind of help do you need?

Speaker 1: Sometimes I don't need help, but if I do, then my teacher comes and help me. Then she gives me the wrong answer. So I have to go and get the other guy, and he gives me the wrong answer. So I just say, forget it, I'll do it myself.

Moderator: So it's really important to have good assistance, that's what I hear you saying. What else would you change about the system? Or do you think it's working pretty good?

Speaker 5: I think that the computer should have a little book that you can go to, you just push a button or something and they help you with that one particular problem that you're having problems with.

Speaker 6: That's the hint.

Speaker 3: That's not a book based on the computer.

Speaker 5: I'm talking about like a little book that could say what you need to do on your problem.

Speaker 6: Like a little index.

Speaker 4: I think for the most part, it's been helpful to me, except for the computer. They have a lot of glitches in it. Like if you, like I had to make an equation yesterday, and it



took me like 10 minutes to do the problem, because when I went up to 'make an equation,' it said "you need an equal sign" or something in the problem, and I didn't need one. So I just, the guy couldn't get out, so my teacher had to do it. But it just took a long time to do it.

Speaker 3: What was I doing yesterday? I defined my goals, and it's like this box that pops up, and sometimes your goal is like the very last thing. Like if they ask how much money in dollars or something, you have to click on that. I clicked on that about five times, and it kept telling me, it wouldn't underline. Then when my teacher came over, she did it. She did it about five times, she kept clicking and going back up there, clicking it and going back up there. And after a while, I just sat there and looked at the computer. And then I tried it again and it finally underlined. So there are a lot of glitches in there. Like when you put your cursor on something and you click that mouse, it should just go.

Speaker 4: And like he said, better assistance. Assistants that actually assist you.

Speaker 6: Guys who know what they're talking about.

Speaker 2: He doesn't like to help. They just sit there and reads magazines all day. Ask for help and it's like.

Speaker 5: Or his newspapers.

Speaker 3: Does everybody have the same assistant?

Speaker 2: I have an old guy and then I have a younger kid with glasses.

Speaker 4: We must have the same old man.

Speaker 1: I've got him too. Both of them, you don't want.

Speaker 3: Every time I go in there, there's only one assistant in there. Now the older man, Mr. Stedman, he's not here anymore.

Moderator: Let me ask this question, do you think that the idea that Maryann has about the peer assistance, what about students as aids? Let's say we have someone in this school

who's really good with computers, do you think if they could be in that classroom helping would that make a difference?

Speaker 2: Yes.

Speaker 5: Only if they wanted to.

Speaker 4: Anybody can want to be one, but can they really assist you is they question.

Speaker 3: Do they know what they're doing.

Speaker 4: Because that man in there, he's supposed to and he doesn't do anything.

Speaker 3: I wouldn't mind as long as the help was good.

Moderator: As long as the help was there -- a student, a parent, or a volunteer -- you just need the help. Ok, we get the message. Thank you for your time, you've been very helpful. It's been very quick.

## Focus Group Transcript

### Dunbar Students

05/24/94

Moderator: We've been hired by the Air Force and by the Dayton Foundation which helped with the computers in this room, to get your opinion as to what you think about this system -- does it work, does it make a difference. And so the first thing we want to start off with, and I have four other questions, the first question is about how do you feel about computers? And let's talk about two different times: the time before you started working with the computers in here and now after working with the computers. Before you started working with the computers, were you familiar with them? Were you comfortable with the use of computers? Anyone can talk. We're not going in order. Everyone is going to have a chance to say something. Before you started on this program, how did you feel about computers?

Speaker 4: I was scared because it was a big change. But our teacher said we were coming down here, it's like we get extra points on the computer. It's like if we get so many problems done, it goes on our grade.

Moderator: So had you used a computer before?

Speaker 4: No.

Moderator: Anyone else?

Speaker 5: I had a computer at home, but it wasn't anything like these -- I had a Commodore. I was familiar with computers.

Moderator: You were much more comfortable than she was?

Speaker 5: Yes.

Speaker 6: I have a computer, but I don't use it.

Speaker 4: I like them. I wouldn't mind having a computer. It keeps your time occupied.

Speaker 2: We've got a computer. But all I do is play games.

Moderator: So you didn't feel intimidated when you came in here, because you were familiar with how they turn them on. So you were fairly comfortable with the technology.

Speaker 4: I got comfortable with them after I learned how to do word problems. But I stopped liking them going to different sections. Like you get comfortable with one section, but then you go on to another one and you've got to learn how to do that problem and then you go to decimals and stuff like that. They just put too much up there at one time.

Moderator: Anyone else? How do you feel about using computers?

Speaker 7: It's ok, I guess. I got sixth period class, we play, we work on computers down there. We just draw on them, though. It's hard.

Moderator: So after using the computers down here, you felt very confident about using the computers here. Anybody else? Ok. Let's take another point of view. What about keyboarding skills, typing skills. Is that important to use these computers -- keyboarding skills?

Speaker 5: Yes. It saves you a lot of time.

Speaker 4: And if you take that class, it saves you a lot of time. You can learn the keys so when you come up here, you won't be slow, and it won't take you all day to get done with your work.

Moderator: How about the mouse?

Speaker 2: That's really easy.

Speaker 4: I don't have that one.

Moderator: Quicker than typing. But you can do it either way.

Speaker 4: I prefer the mouse

Moderator: Ok. Now that you've used the computer we can talk about this a little bit. Do you feel more comfortable with computer technology now than you did before the class started?

Speaker 4: I do.

Speaker 5: I do, too.

Speaker 1: I do.

Moderator: I think that's true. Once you use something you feel better about it. What about help when you're in the computer room?

Speaker 4: I ask for a lot.

Speaker 5: Only on problems that I don't understand do I ask for help. But getting to certain things, I already know about computers. Like certain sections, like tools and exit.

Speaker 4: I ask for a lot of help if I don't understand it. Because I'm not the type of person who acts like they're scared to ask for help and keep on asking. If I don't understand it, I'm going to keep on asking until I get it right.

Moderator: So it's real important to have someone in the room to help you. Is there enough help in the room?

Speaker 2: No.

Speaker 4: Not. Sort of. There kind of is, and there kind of isn't. Most people don't ask for help then, and a lot of people ask for help and they only have two people and two people can't help everybody at one time.

Moderator: So there's two people in here at one time, two adults?

Speaker 5: Your teacher and sometimes Mr. Herborg.

Moderator: And sometimes you have to sit at your computer waiting for them to help?

Speaker 4: And then you'll be waiting for a long time before they get to you and the class period will be almost up. And you're just like, forget it.

Moderator: What would you recommend to improve that situation? Any thoughts about that? How could the school improve that so you don't have to sit there and wait.

Speaker 5: You can have students to help other students. But my math teacher, she doesn't let people get up out of their seats and help other people. If you know what you're doing, you should be able to help other students. But she doesn't let us do it.

Speaker 4: Our teacher's not like that, up to a certain point. She'll let us help each other, and if we get too loud, she'll tell us to sit back in our seats or cut the noise out.

Moderator: Any other suggestions on how to increase the amount of help?

Speaker 2: Help files on the computer

Moderator: More help files.

Speaker 4: There's a help file on there that tells you how to do it. I think that's enough help on the computer because

Speaker 6: Once you start the problem, they tell you to ask the teacher.

Speaker 4: It helps me a lot 'til I get to the problem, ask your teacher for help, then I have to ask my teacher for help. But I like the help on there.

Moderator: Ok. Would you all kind of agree that it would be really helpful to have students be able to get out of their seats and move around and help other students?

Speaker 4: Yes.

Speaker 2: Yes.

Speaker 5: But sometimes you may cause confusion.

Speaker 4: Then the teacher thinks you're giving them the answer and not helping them. That's our teacher. She'd think you're giving them the answer instead of helping them.

Moderator: Any other thoughts about that? What about what you do in the classroom? Does that prepare you to come in to the computer lab? Is there a strong relation as to what happens in the classroom with what happens here?

Speaker 4: No.

Speaker 2: No.

Speaker 3: No.

Speaker 5: The teacher just goes over the things that you might do.

Speaker 4: But when you come in here, you don't do it on the computer. It's a totally different thing.

Moderator: It's a different process, or is it a different type of problem?

Speaker 4: It's a different process. Say for instance, we're in our math class and we're doing something on 5.1 and then we come in the computer lab, it's something different. It's a whole different thing. And then she explains in computer lab, you catch on. Then you just go from there.

Moderator: What about the rest of you? Do find the same experience -- the classroom is different from what happens in the lab?

Speaker 6: What we go over on the computer is pretty much already there.

Moderator: Any other thoughts about that? What about, what would you recommend to the teachers?

Speaker 4: To give us some help. Like if we're going to come in the lab, she should tell us ahead of time what we'll be doing. But, then again, everybody might not be on the

same thing in the lab. For instance, he's ahead of me and I'm behind him. She can't help both of us at the same time. She can't explain two different things.

Speaker 5: If you have an after school program where you have students come in, and they teach you about different lessons on different levels. Then when you go to school the next day and you come in here, you can explain it to the next student who doesn't understand.

Speaker 2: Who wants to do that after school, though.

Speaker 4: But if you feel your grade is failing and you want help, believe me, they'll come if they don't want to repeat the ninth grade or whatever grade. They know that there's help available, they'll come.

Moderator: What other recommendations do you have for your teachers? I didn't remember your names, so I'm not going to say who said what.

Speaker 4: Do you mean how the teachers act?

Moderator: No. In how they could make the classroom match the lab or make the lab match the classroom. I get the feeling that there's two different things happening. Let me ask this question, do you think it would be important that these two would be parallel, that is working together?

Speaker 4: Yes.

Speaker 5: Yes. But every class can't come in here at the same time. But if you want computer lab five days a week, everybody can't come in here at the same time.

Moderator: How often do you come here now?

Speaker 5: Once a week.

Moderator: And you think that's not enough?

Speaker 5: I think it's enough time; she gives us an ample amount of time to do a certain amount of problems.



Moderator: What if one of the computers or three of the computers were in your classroom?

Speaker 4: We have computers in our classroom. But I don't think they're the computers for what we're doing anyway.

Moderator: But what if these were in your classroom?

Speaker 5: That would be a lot easier.

Speaker 2: People would be fighting to use them.

Moderator: Maybe every student should have their own computer. Do you think that ought to happen?

Speaker 5: Yes.

Moderator: Do you think that will happen?

Speaker 5: I don't know. Maybe, if we get our -- not to be political -- but our tax dollars and stuff. Our school system doesn't have any money.

Speaker 4: They've got it; they're just being stingy with it.

Speaker 2: They're getting money from every direction, they're just using it.

Speaker 4: I tell you, they just don't want to put it where it needs to be.

Moderator: What about the relationship between what is happening here in the lab and tests that you've taken, like the proficiency test? Does what you learn here help you with the proficiency test?

Speaker 4: No.

Speaker 5: It's helping me.

Speaker 4: I passed the math. I completely guessed and I passed the math. It was hard. But I think before we took the proficiency test, they should have gone over what we were doing. Because the literature teacher I have, he doesn't show us how to write. All we do in his class is read the book or do worksheets. That's what we do every single day. He doesn't teach us how to write; how does he expect us to pass the writing?

Speaker 5: Our language arts teacher, we come in here maybe twice a week. And she asks us to write essays. She gives us a prompt, and we have to answer the prompt and write an essay, and the computer prints it out and she grades it.

Moderator: And you think that helped you on the proficiency test?

Speaker 5: Yes.

Speaker 4: We don't do that.

Speaker 5: Because I didn't know what a thesis statement was until I came in here.

Speaker 6: Neither did I.

Speaker 2: I still don't.

Moderator: You just moved to the area?

Speaker 5: No, I've lived here all my life, but I had never wrote an essay. If I wrote an essay, I just copied the same thing out of the encyclopedia.

Moderator: So this is the first real chance to write something that you've had? And you think that's very helpful. What do you think about the math portion? Let's think about just the math portion. Does the process that you go through with your math here in lab help you with your proficiency test?

Speaker 5: I passed mine.

Speaker 4: I didn't help me at all.

Moderator: You passed it before you came in here.

Speaker 4: I passed math on a lucky thin line.

Speaker 2: I passed mine.

Moderator: Ok. Let me ask you a question. By working with this computer program, do you think it might help push you a few points over.

Speaker 4: No because they'll still be doing, the computer is not on the proficiency.

Speaker 2: See, they have like 300 plus five.

Speaker 4: And then divide it and put it in a decimal. I completely guessed; I'm not going to lie. I guessed and I passed. I don't know how, but I did.

Moderator: You're practicing a kind of math called probability.

Speaker 4: I don't know what it is. I understand math in the classroom. But you know how you get into a chapter, and you'll be all into it and you know what you're doing and you come here and do your work. Then she wants to start a new chapter. Then you have to let all that out of your head and bring the new chapter in. That's difficult.

Speaker 2: And then they want to come back to that chapter, and say, "Remember this?"

Speaker 5: Sometimes, when I took the proficiency test, I studied for a week before the proficiency test. And I knew all the material that was in the book from all the chapters that we did. But when I got the test . . .

Speaker 4: It was totally different.

Speaker 5: My mind went completely blank. Everything on the test was different from what we did in the classroom.

Speaker 4: From what she studied. That's why I didn't study, and I passed.

Speaker 2: Only thing that helped was when we went to that review class.

Speaker 4: I didn't even go to that.

Speaker 2: You could just have to be here to pass.

Moderator: I have in my hand the last question. What do you think about student behavior in this room, as compared to the classroom? Any difference?

Speaker 4: It's a lot different. When they come in here, it keeps them busy. They're just so busybody. And they're like, that's our classroom, we don't get up and run around. We might get up and walk, but we don't get up and walk around a lot. Not in here we don't. Because if we do it, we know we're not coming back.

Speaker 5: It's a lot of high tech equipment in here. That's why, you can't horseplay in here because the equipment, you don't have enough money to pay for all the damage that you've done. But they gave us a list of rules the first day we came in here.

Speaker 7: People play in here. They don't even know you're supposed to get a grade in here. I think more people play in here than in the classroom sometimes.

Moderator: You think they played more here than in the classroom. Can you give me an example?

Speaker 3: Not in ours.

Speaker 7: People just talk and walk around a lot. And the classroom, she'll be more strict.

Moderator: And you think that's a better situation? Which one do you prefer? Which situation?

Speaker 7: This one.

Moderator: You like working with the computers more than in the classroom.

Speaker 4: I don't

Speaker 2: I do.

Speaker 5: I don't like writing. I'd pick a computer over writing any time.

Speaker 4: If what I did in the classroom, we could do on the computer, then I wouldn't mind sitting at the computer. But if it's going to be two different things, then I prefer the classroom.

Moderator: What about something that's related to that -- student motivation? Do people try harder in here or try harder in the classroom?

Speaker 4: I try harder in both.

Speaker 1: All you have to do is get the answer down. You don't have to put anything else down.

Speaker 3: As long as you know the answer.

Moderator: You're saying that you get the answer from a machine, but I'm not sure exactly what you're saying.

Speaker 3: You don't have to put anything

Speaker 4: You don't have to explain your work.

Speaker 3: You don't have to put down any of your steps, you just put the answer down.

Moderator: You can do it lots of different ways.

Speaker 4: We have to show every step.

Speaker 3: We just put the answer down.

Speaker 4: If we do that, we don't get any credit. Because our teacher goes back and prints a lot of stuff out and looks at it.

Speaker 3: You can just get up and get the answer.

Moderator: So just by playing with it, you're learned a lot of different tricks to it.

Speaker 7: A couple.

Speaker 3: If you can do one problem, you can do the rest of them. They're all the same.

Speaker 5: But that's why they do that, so you can learn how to do that process.

Moderator: Another thing related to students is attendance. Is attendance better the days you're in lab than the days you're not.

Speaker 1: I can't tell any difference.

Speaker 5: I think so. Some people like working with computers. Sometimes they have good graphics. I like working on computers.

Speaker 4: I do too.

Speaker 5: Some days when you get done with your work, the teacher lets you do a couple extra credit problems and then you can play a game or something.

Speaker 4: Our teacher doesn't let us do that.

Speaker 1: We have to keep on going until the end of class.

Speaker 2: Keep on going. 30 problems, keep going.

Speaker 4: Just like yesterday, we did a test. And she said, "It is and it's not going to count against your grade. But if you get done with all seven problems, then I know you get it." So everybody took their time and didn't finish. And she was like, "That's all right, that's all right." But I still guessed.

Speaker 2: I went straight through it.

Moderator: One of the things that we know about students is that not every student learns the same way. Would you agree with that?

Speaker 4: Yes.

Moderator: What type of student do you think would benefit the most from this type of learning?

Speaker 5: You have to like to computers. I like computers.

Speaker 4: You have to know how to use them.

Moderator: Would you say that the students who were the top of the class would benefit the most?

Speaker 3: Yes.

Speaker 2: Yes.

Speaker 5: The top.

Speaker 4: But if you're at the top, you can't really just focus on the people that are at the top because the people below you may come up in the long run and catch up with you. I think that you should give everybody a compliment on what they do, even if they don't know what they're doing. Because it's not always the upperclassmen, because there are freshman who are smarter than the upperclassmen.

Speaker 5: Some of the people who don't get good grades, they benefit from computer lab. Some people that I know. They came in here and they didn't know what an equation was, but after the computer lab, they sort of came up.

Moderator: So you think it really benefited them?

Speaker 6: I was failing all my classes at the beginning of the year.

Moderator: Do you think this helps, do you think this made a difference? Can you give me a specific example?

Speaker 4: I think if you come in here and you do a problem, and you don't know what you're doing, then get a sheet of scrap paper and try to figure it out. And I think that's when you should ask a teacher for help.

Speaker 3: Our teacher won't let us use scrap paper.

Speaker 4: My teacher let me use scrap paper.

Speaker 2: My teacher's like, "What are you writing?"

Moderator: One last question. You're the principal of the school. What would you do, if you were going to make a recommendation to the superintendent about using this type of learning in your school. What recommendation would you make?

Speaker 1: Buy more computers.

Speaker 4: In every class, in every math class. Enough for each student.

Speaker 2: Fix the heaters, because our heaters get hot after a while.

Speaker 5: Have a heating and cooling system in every room.

Speaker 4: And computers in every math room.

Speaker 5: And language arts, too.

Speaker 2: All of them.

Speaker 5: But our biology class has a computer lab; it's right next door. And they help us with just biology.

Speaker 4: If you're going to have computers in every math class, you shouldn't have them in a literature class. Every class can take time and come in here once a week.



Moderator: You're the principal now. You can get us computers.

Speaker 4: If I'm the principal, I'm going to hook it up. Get some air, some heat, and some computers.

Speaker 2: And some computers and some paper, and some cards, and some pencils, and some desks.

Speaker 4: Some new desks and new chairs.

Speaker 1: A new school.

Speaker 4: Because I saw a mouse the other day.

Moderator: One last chance. Anybody want to make one more comment? Thank you for your help. We appreciate it.

## COMFORT

Technicians and Site Coordinators	Trotwood Students	Trotwood Teachers	Trotwood Totals	Dunbar Students	Dunbar Teachers	Dunbar Totals	TOTAL	Code	Description
5			0	1		1	6	SPreComf	Student comfort w/computers before FST
2	3		3	1	1	2	7	SPostComf	Student comfort w/computers after FST
5	4	1	5	1		1	11	SPreDisComf	Student discomfort w/computers before FST
3	9		0	8		0	0	SPostDis	Student discomfort w/computers after FST
2			9			8	20	SComExp	Student has computer experience
6	5		0	5		0	2	SLabTime	Students need lab time for comfort
4			5			5	16	NSCE	Students not proficient w/keyboard/mouse
3			0			0	4	SEExperiment	Student needs to experiment for comfort
24		1	1		1	1	5	TPreComf	Teacher comfort w/computers before FST
11		6	6		2	2	32	TPostComf	Teacher comfort w/computers after FST
2		2	2		1	1	14	TPreDis	Teacher discomfort w/computers before FST
1		4	4		3	0	6	TPostDis	Teacher discomfort w/computers after FST
22		8	8		7	3	12	TComExp	Teacher has computer experience
1		7	7		7	7	36	TLabTime	Teachers need lab time for comfort
			0			0	1	NLabTime	Teachers do not want lab time
		1	1		2	2	3	TConfidence	Teacher confidence with computers
1		2	2		4	4	7	NTCE	Teachers not proficient w/keyboard/mouse
3		1	1		3	3	7	Trip	Teacher training in San Antonio
			0		1	1	1	TFrustrate	Teacher frustrated with computer

# SUPPORT

Technicians and Site Coordinators	Trotwood Students	Trotwood Teachers	Trotwood Totals	Dunbar Students	Dunbar Teachers	Dunbar Totals	TOTAL	Code	Description
2	11	15	26		5	5	33	TechS	Lab technician support is needed
1		4	4		4	4	9	Release	Administrative support for release time
	17	8	25	8	11	19	44	PeerS	Need for additional aide/peer support
13	2	1	3	2		2	5	NPeerS	Not want peer support
4	7	8	15	2		2	30	Script	Guided instructions/manuals
			0		2	2	6	FP	Establish planning period
			0		2	2	2	SCoord	Site Coordinator
	3	1	4			0	4	NScript	Manual would be helpful

# CURRICULUM

Technicians and Site Coordinators	Trotwood Students	Trotwood Teachers	Trotwood Totals	Dunbar Students	Dunbar Teachers	Dunbar Totals	TOTAL	Code	Description
4	4	6	10		6	6	20	Curriculum	FST matches curriculum
3			0		16	16	19	Review	FST serves as a good skills review
4	2	4	6	7	1	8	18	NCurriculum	No match between FST and curriculum
3	4	1	5	1	4	5	13	Prof	FST matches proficiency test
	6	5	11	5		5	16	NProf	No match between FST and proficiency test

# MOTIVATION

Technicians and Site Coordinators	Trotwood Students	Trotwood Teachers	Trotwood Totals	Dunbar Students	Dunbar Teachers	Dunbar Totals	TOTAL	Code	Description
0			0		2	2	2	Competition	Competitive Students are motivated
1			0			0	1	Reinforce	FST gives reinforcement for correct response
5	5	3	8	1	4	5	18	SFrustrate	Students are frustrated
10	8		0		1	1	1	Individual	Motivation varies by individual
			8	5	13	18	36	Motivate	FST lab motivates students
			0		5	5	5	NBI	Notebook provides insight about students
8	7		7	5		5	20	D/B	FST lab fosters good behavior
1	4		4	2		2	7	ND/B	FST lab does not foster good behavior
			0	1	3	4	4	Attendance	FST lab improves attendance
2	1		1	1		1	4	NAttendance	FST lab does not improve attendance
4		1	1		2	2	7	Printout	Printouts are helpful to teachers

State of Ohio  
Board of Education



# School Slate

*"Schools and the means of education shall forever be encouraged..."*

*Ordinance of 1787*

No. 546

January—February 1994

## Staff, students committed to success: Dunbar seniors make notable gains on proficiency tests

*Submitted by Jill Moberley, Public Information Officer, Dayton City Schools*

Students at Dayton's Dunbar High School are not intimidated by the Ohio Ninth-Grade Proficiency Tests, even though statistics might give less determined students cause for concern. Popular opinion says that high school seniors who have scored low and have not yet passed the math portion of the proficiency tests may not have a chance of passing the test at all.

Dunbar seniors made unexpectedly high gains upon retaking the tests this fall—especially in mathematics. Students in the class of 1994 moved from a 26 percent passing rate in the fall of 1992 to a 71 percent passing rate in the fall of 1993. It is considered highly unusual for a student to gain more than eight or ten points upon retesting. However, eleven of the seniors who passed the math portion this fall gained from 13 to 25 points. Thirty of the 42 students who had not passed all four parts of tests after six opportunities passed the mathematics portion in the fall of 1993.

According to Dayton City Schools

Superintendent James A. Williams, much of the students' success can be credited to staff members' commitment to provide the time, attention, and opportunities students need to succeed. Among the resources available to the Dunbar staff and students are the school's Disadvantaged Pupil Program Fund (DPPF) reading and mathematics labs and the Fundamental Academic Skills Tutor (FAST) Track program provided through the district's partnership with Wright-Patterson Air Force Base and the Alliance for Education.

The focus of the DPPF mathematics lab shifted when the district applied for a grant last school year to target seniors in need of passing one or more portions of the proficiency tests. Scores compiled in the spring of 1993 revealed that district eleventh-graders had a passing rate of 53.2 percent. The students who would be seniors in the 1993-94 school year would be given priority. DPPF monies are used this school year for reading and math centers

that also focus on the other areas of the proficiency tests: citizenship, study skills, and writing. The goal is to improve academic performance on the proficiency tests for all qualifying students who are assigned to the DPPF lab. Students remain in the assigned labs until they have passed all portions of the tests.

Meanwhile, the high-tech FAST Track lab supplements teacher instruction and reinforces skills taught in the traditional classroom setting. Students in the ninth grade were introduced this year to software programs that use artificial intelligence to help them with algebra, critical-thinking skills, reading, and writing.

This year's proficiency tests results have been so remarkable that Ohio Governor Voinovich has planned a visit to the DPPF and FAST Track labs to see how students and staff are using technology to prepare for the proficiency tests.

According to Dunbar principal Leon Love, seniors who must pass one or more portions of the tests

have been scheduled to attend daily classes this year for additional instruction in their area or areas of need. The special labs in reading, writing, citizenship, and mathematics are required of seniors and can be dropped only with parental permission.

The special classes are not Carnegie unit courses. While earning credits for graduation is important, staff members observed that low self-esteem was the greatest obstacle for students who failed portions of the tests.

School staff members place great emphasis on the required labs and let seniors know that the proficiency tests are a priority. That message is underscored when principal Leon Love, a former social studies teacher, personally teaches the citizenship classes developed for seniors.

"We expect students to pass the [proficiency] tests," says Love. "And we will do everything we can to help our students pass. We don't accept an attitude of failure." **S**

DAYTON DAILY NEWS  
THURSDAY, MARCH 3, 1994 •

## Metro State

## Voinovich promotes computer plan at Dunbar

by Mark Fisher  
DAYTON DAILY NEWS

Shawn Quinn had the governor's ear, and he made the most of it.

Quinn, a Dunbar High School senior, eagerly showed off his computer skills to George Voinovich on Wednesday during the governor's tour of the school's high-tech labs. Quinn told the governor he planned to enlist in the Navy following graduation — and the computer was helping him reach that goal.

"If it wasn't for this computer class, I would still have three proficiency tests to pass," Quinn said later. "Now I only have one, and that's writing. This class has helped me a lot."

Voinovich has proposed spending \$95 million of state money to wire all Ohio public schools for video, voice and data transmission and to equip the state's poorest districts

with computers. His visit to Dunbar was designed to tout that initiative as well as to highlight the technology's usefulness in helping students pass a statewide proficiency test.

Students must pass all four parts of the Ninth Grade Proficiency Test — math, reading, writing and citizenship — to receive a diploma. The tests are being administered next week.

The governor praised the two computer labs he visited and the Dayton school system, which he said was "miles ahead" of some other urban districts in the state in using computers and related technology.

"You're doing some good things here, and we're very, very proud of you," Voinovich said of the school district.

Superintendent James Williams said Dunbar's most sophisticated computer lab resulted from the collaboration of the school

district, Wright Laboratory at Wright-Patterson Air Force Base, AT&T Global Information Solutions and the Alliance for Education.

The collaboration, in the second year of three-year research program, allows Dunbar teachers to use Air Force software developed to help train recruits in basic mathematics and other subjects. Air Force researchers in turn can collect data from the computers to help them fine-tune the training programs.

Dunbar teacher Ron Rogacki said students have responded to the technology.

"I've noticed students really enjoy writing and they write more," Rogacki told the governor. The program will shift its focus next school year to science.

Voinovich also toured a Head Start Center at Zion Baptist Church on Earlham Drive in Dayton to learn about an innovative anti-drug program there.

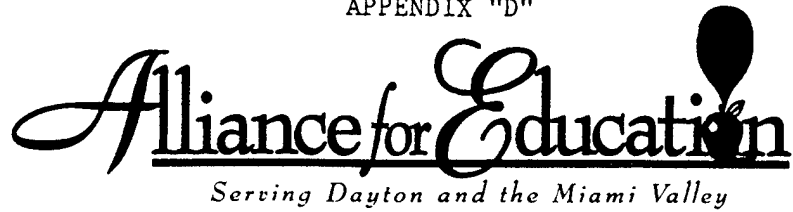


MONA REEDER/DAYTON DAILY NEWS

## Voinovich promotes computers

Sean Quinn, a senior at Dunbar High School, shows Gov. Voinovich some of the programs available in the computer lab. Voinovich went

to several schools on Wednesday to promote his plan to equip public schools with technology using state money. **See story, page 2B**



***EXCERPTS FROM***

**1994 Project GEMMA**

**PROGRAM EVALUATION  
REPORT**

**October 13, 1994**

# 1994 PROJECT GEMMA

## DATA AND STATISTICS

TEACHERS	
♦ Total # of Teacher Applicants	35
♦ Total # of Teachers Placed	29
♦ Additional # of Teachers in TRAC Program at EG&G who also participated in seminars	5
♦ Average # of years teaching experience	6 (range 1-29)
♦ # of Districts Represented	15
♦ # of Schools Represented	22
♦ # of Schools Represented by more than 1 teacher	6
♦ # of High School Teachers Placed	27
♦ # of Middle School/Jr. High Teachers Placed	7
♦ # of Mathematics Teachers Placed	16
♦ # of Science Teachers Placed	17
♦ # of Mathematics/Science Teachers Placed	1
♦ # of "Repeat" Teachers	6
♦ # of Teacher "Teams" from Same School or District Placed Together at Site	7 (15 teachers)
SITES	
♦ Total # of Participating Business/Government Sites	10
♦ Total \$ Contributed by Sites to Alliance to Support Seminars	\$8,750
♦ Average \$ Expended by Each Site per Teacher to Support Program	\$6,000 +



## 1994 PROJECT GEMMA SITES

SITE	# YRS. GEMMA PARTICIPANT	# TEACHERS PLACED IN '94
Bank One, Dayton, NA	4	1
Children's Medical Center	2	2
Delco Chassis Division, General Motors	5	4
EG&G Mound Applied Technologies	4	2 GEMMA 5 TRAC
Harrison Division, General Motors	3	2
Iams Company	1	1
Scitex Digital Printing, Inc. (formerly Eastman Kodak Company)	4	2
TASC (The Analytic Sciences Corporation)	4	2
Woolpert	3	1
Wright-Patterson Air Force Base Wright Laboratory Armstrong Laboratory Multimedia Center	5	12
<b>TOTAL: 10 SITES</b>		<b>29 GEMMA &amp; 5 TRAC TEACHERS</b>



*Serving Dayton and the Miami Valley*

## EXECUTIVE SUMMARY

### PROJECT GEMMA

(Growth in Education through a Mathematical/Scientific Mentorship Alliance)

#### PROGRAM GOALS

- 1) To improve teacher and, therefore, student understanding of the "real world" and its applications of mathematics and science*
- (2) To influence teaching methods and student understanding and enthusiasm for mathematics and science.*

**GEMMA Teachers, business mentors and GEMMA Academic Team members agree that the goals of the GEMMA program have been addressed.**

**Themes emphasized throughout the GEMMA experience will likely be transferred to GEMMA teachers' classrooms.**

In an effort to provide objective feedback regarding the success of the 1994 GEMMA program, **Tom Wilson, Sinclair Community College associate professor of Mathematics and adviser to the GEMMA program since its inception**, reviewed teachers, site representatives and Academic Team members' end-of-summer surveys, as well as the teachers' Classroom Transfer Plans. He also facilitated Spring, 1994 focus group sessions with 1993 GEMMA teachers. A summary of his comments follows:

- ♦ Evaluations and feedback by teachers, site representatives and Academic Team members supports the fact that **the 1994 GEMMA experience was successful and accomplished established goals and objectives.**
- ♦ **There was a substantial increase in the number of teacher participants over 1993.** (29 teachers from 18 schools in 11 districts--a 31% increase over 1993 and a 300% increase over the pilot year in 1990--were placed at 10 sites in 1994.)
- ♦ **The regularly scheduled seminars were crucial to the GEMMA program's success.**
- ♦ **S<sup>2</sup>MART<sup>2</sup> BET (Elementary GEMMA) evaluations indicate that component was also a success.** Teachers rated experience 9.85 on a scale of 1 to 10.
- ♦ The 1994 GEMMA and TRAC teachers' Classroom Transfer Plans (classroom activities to implement lessons learned) are more complete, detailed and technical than last year's Plans. Some teachers plan to use outside resources.

- *Centerville High School mathematics teacher John Carroll* developed an exemplary Plan in which Algebra, Geometry and Pre-Calculus students will research one of the fundamental topics of mathematics and science--patterns. And, they will report their findings to the Pattern Theory Group at Wright-Patterson Air Force Base. Thus, the site will help determine success of the Transfer Plan while it is being implemented.
- *Edgewood High School science teacher and TRAC participant (at EG&G Mound), Terry Stephens* will facilitate his eleventh and twelfth grade Physics classes as they research cellulose and nitrocellulose. Students will use conventional research methods such as the school library, as well as the newest technology via Internet (thanks to a unique partnership with Miami University).
- ♦ When asked about increased motivation and likelihood for implementation of GEMMA "themes" in the classroom, those surveyed indicated that **some themes, such as promoting student investigation and emphasizing teamwork and cooperative learning, are more likely to be implemented than others.**
  - Special focus in future summer seminars on identifying classroom activities that strengthen school-industry relationships, methods of encouraging attitudes and interpersonal skills valued by industry, integration of mathematics and science instruction, the technical aspect of writing and communications may lead to a greater likelihood of those concepts' transfer to the classroom.
  - Although everyone agreed on the importance of emphasizing and integrating technology into classroom activities, lack of access to technology remains a barrier for some teachers.
  - Although career-related information is important for teachers to impart to their students, the GEMMA program's ultimate goal is to provide teachers with knowledge and strategies to help increase students' understanding of mathematics and science.
- ♦ **At the end of the summer, teachers reported a greater understanding and need for the themes addressed by the GEMMA program.** Follow-up surveys and interviews may help determine whether "appreciating" a concept actually transfers into the teacher's abilities to "use" that concept.
- ♦ **The challenge of maintaining the momentum of the GEMMA experience after the summer ends is a common issue.** Alliance efforts to connect teachers and mentors via the Dayton Free-Net, a local electronic communications network, may help, as will the Winter GEMMA Symposium and other academic-year activities. Hopefully, mentors will also initiate contact with their teachers.
- ♦ **Regular, formal contact with the work-site or GEMMA program during the academic year may help maintain that momentum.** Arrangements might include teachers working on a site project from time to time, giving workshops for other teachers, or even developing additional Classroom Transfer Plans. If teachers could be "contracted" for some of their time, these kinds of arrangements could also give teachers some precious time to develop and create.
- ♦ Increased efforts on the part of GEMMA organizers to **encourage school district and building support for GEMMA teachers as they attempt to implement change may result in greater teacher success.**
- ♦ Additional qualitative, follow-up feedback on the effectiveness of the GEMMA program might be obtained through **interviews and/or surveys of GEMMA teachers' administrators and students.**

# 1994 Project GEMMA Program Evaluation

**The following evaluation is based on:**

- ♦ The "cornerstone" experience which 1994 GEMMA teachers had during the summer as they worked in industry for 8 weeks.
- ♦ Feedback from 1993 GEMMA teachers, obtained in order to more fully evaluate the effect of the GEMMA program on participating teachers--and more importantly on their students. *Similar follow-up with 1994 GEMMA teachers will take place in Spring, 1995.*

**The focus of this evaluation is on the following program goals:**

- (1) *To improve teacher and, therefore, student understanding of the "real world" and its applications of mathematics and science*
- (2) *To influence teaching methods and student understanding and enthusiasm for mathematics and science.*

## **Assessment tools included**

- 1994 GEMMA teachers' baseline and end-of-summer surveys
- Final technical reports in which teachers described their on-site projects and responsibilities
- Individual 1994 teachers' Classroom Transfer Plans (classroom activities developed to implement lessons learned on-site)
- 1994 site representatives' and Academic Team end-of-summer surveys
- Follow-up information about 1993 GEMMA teachers, including meeting notes from Spring, 1994 focus group sessions, anecdotal information collected by staff, 1993 "Tool Kit" Grant final reports, and teacher evaluations of dissemination activities.

Informal assessments including staff observations and conversations with various participants also assisted in the evaluation process.

**Sharon Dutcher, Centerville High School mathematics teacher and Master GEMMA Teacher**, reviewed all Classroom Transfer Plans for GEMMA themes and summarized each report. That summary is included in this report. (See Orange)

**Tom Wilson, Sinclair Community College associate professor of Mathematics and adviser to the GEMMA program since its inception**, has reviewed teachers, site representatives and Academic Team members' end-of-summer surveys, as well as the teachers' Classroom Transfer Plans. His comments are included in the Executive Summary/Overview section of this report.

Additional questions concerning the operation or evaluation of the GEMMA program may be directed to Sue Rinehart.

## PROGRAM OBJECTIVES ACCOMPLISHMENT

**OBJECTIVE I:** To increase professional sharing through a network of mathematics and science teachers (and, through them their students) and businesses, industries and government agencies that use mathematics and science.

**STRATEGY:** Recruit and place at least 25 teachers at a minimum of 10 business sites.

### ACCOMPLISHED

- ♦ 29 teachers from 18 schools in 11 districts—a 31% increase over 1993 and a 300% increase over the pilot year in 1990—were placed at 10 sites in 1994.
- ♦ 5 additional teachers in the Department of Energy's TRAC (Teacher Research Associates) program at EG&G Mound Applied Technologies also participated in all academic sessions and completed all GEMMA assignments.
- ♦ One GEMMA site, Wright-Patterson Air Force Base, significantly expanded their teacher placements to additional Wright Laboratory directorates, as well as to directorates in Armstrong Laboratory and the Base's Multimedia Center.
- ♦ The Iams Company's Research and Development Center was a new site in 1994.

**STRATEGY:** Support industrial mentors as they guide and teach the GEMMA teachers

### ACCOMPLISHED

- ♦ 35 site representatives attended the pre-mentorship briefing in May which included a special break-out session conducted by an experienced site liaison and mentor.
- ♦ Guidelines for mentors and site liaisons written by experienced mentors and site liaisons were distributed to all site representatives.
- ♦ A "break-out" session conducted by an experienced mentor was held for site representatives during the first summer seminar.
- ♦ Academic team members and staff maintained regular contact with sites and teachers.

**Feedback provided by 23 of 39 mentors & site liaisons on end-of-summer surveys**

Rated by Site Representatives	Average Rating on 1-5 scale, 1993	Average Rating on 1-5 scale, 1994
Usefulness of May Briefing	3.7	3.7
Usefulness of Guidelines	3.9	4.5
Usefulness of Seminar Break-out Session	4.1	4
Understanding of own role as summer began	3.9	4
Understanding of own role as summer ended	4.4	4.9
Understanding of program goals as summer began	4.3	4.2
Understanding of program goals as summer ended	4.6	4.6
Level of support received from site	4.2	4.3
Accomplished personal goals for program	N/A	4.2
Level of support received from Alliance	4.7	4.8

**STRATEGY: Bridge the cultural gap & build collegueship by encouraging interaction**

**ACCOMPLISHED**

- ♦ 80 GEMMA and TRAC teachers, site representatives, and university mathematics and science educators attended the May Pre-mentorship Briefing.
- ♦ All mentors then visited the teachers' classrooms before school ended in June.
- ♦ A concerted effort was made to ensure that at least two teachers were placed at each site--with success at 7 of 10 sites. Budget constraints prevented the other 3 sites (Bank One, Iams and Woolpert) from hosting more than one teacher. However, all three have been encouraged to do so in 1995.
- ♦ 7 GEMMA teacher "teams" (totaling 15 teachers) from the same schools and/or complimentary disciplines were placed at sites together.
- ♦ Five Teacher Leaders plus one Master GEMMA Teacher, all of whom were participating in the program for a second or third year, took significant leadership roles. With the assistance of the eight university mathematicians and scientists on the GEMMA Academic Team, those teachers planned and helped facilitate five seminar sessions. This group of teachers significantly expanded the project's support systems.
- ♦ For the first time a formal communications network was established under the leadership the GEMMA Master Teacher. She and the Teacher Leaders maintained regular contact via phone, site visits and informal lunches with their groups of teachers--in some cases in addition to daily contact with those on-site. These teachers plus the university members of the academic team initiated more than 100 separate contacts with first-year GEMMA teachers and their mentors during the eight-week experience.
- ♦ All GEMMA and TRAC teachers were also given accounts on Dayton Free-Net (a local communications network available to anyone for the price of a local phone call) in an effort to use technology to increase their interaction and collegial support. Site representatives were also encouraged to obtain accounts. Ten teachers "logged on" from their business sites. Those teachers, two academic team members, one GEMMA site liaison, and Alliance staff posted a total of 67 messages on a private discussion area set up for the GEMMA program. Discussion topics included how to transfer their summer experiences to their classrooms, technology available to them in their classrooms, and potential grant opportunities to acquire computers and modems in their own classrooms.. Seven teachers and some GEMMA advisers continue to dialogue on the Free-Net GEMMA "message board." And, Alliance staff is working to expedite Free-Net access for eight mentors who have requested accounts.
- ♦ Although some teachers at some sites worked independently of others, *those at the same site did regularly interact informally*. An example of such interaction took place at WPAFB. Site Liaison Harvey Paige and the GEMMA teacher leaders at the Base scheduled weekly lunches for the 12 teachers with various Wright Lab managers, as well as visits to areas of the Base of interest to the teachers.
- ♦ All teachers attended at least 4 of the 5 seminars which were held at different GEMMA sites. Teachers and mentors at host sites conducted mini-demonstrations, tours and panel discussions in an effort to expose all teachers to as many sites as possible.
- ♦ All teachers designed and constructed "presentation boards," describing their plans for classroom transfer, which they displayed at a final luncheon and program held at WPAFB Officers Club for site representatives and Alliance Board members. Three teachers then led luncheon participants through a portion of their plans.

**STRATEGY:** *Provide Publicity for Teachers, Sites and Alliance*

**ACCOMPLISHED**

- ♦ An article which focuses on GEMMA entitled "Industry Internships and Professional Development" by Dr. Ann Farrell, Wright State University assistant professor of Mathematics and Academic Team coordinator, has been included in the National Council of Teachers of Mathematics 1994 Yearbook, *Professional Development for Teachers of Mathematics*. Articles selected for publication "describe very creative projects and programs from the educational and business communities. High levels of cooperation and collaboration among those constituencies committed to reforming mathematics education are showcased...."
- ♦ Dr. Harvey Paige of WPAFB's Wright Laboratory presented a GEMMA "poster" at the 1994 Sigma Xi Forum entitled "Scientists, Educators and National Standards--Action at the Local Level" in Atlanta in April. Sigma Xi is a national scientific research society.
- ♦ News releases were sent to area newspapers and school districts at the beginning and end of the summer announcing the teachers' (and mentors) participation in the GEMMA program.

**OBJECTIVE II:** To increase classroom implementation of (1) "business/real world" approaches to mathematics and science and (2) curriculum standards promoted by national mathematics and science teaching organizations.

**Increase use of:**

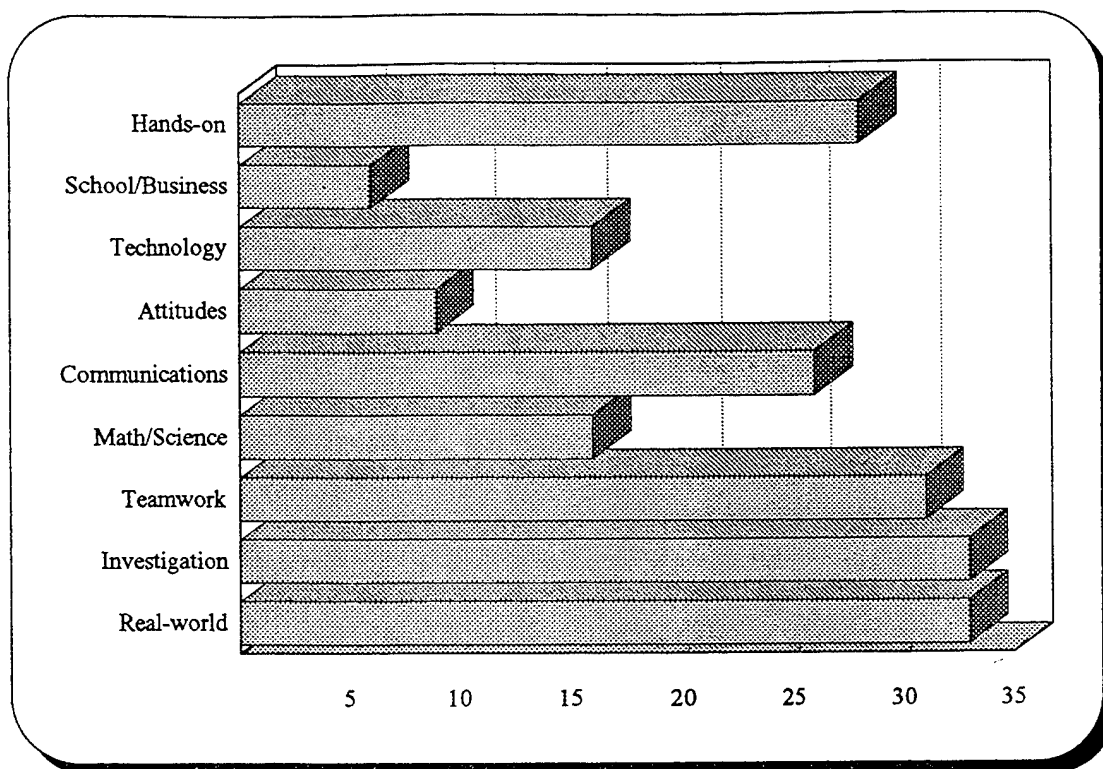
- "Business/real world" applications of science and mathematics
- Instruction that promotes student investigation
- Teamwork and cooperative learning
- Integration of mathematics and science teaching
- Communications skills needed by industry
- Attitudes and interpersonal skills valued by industry
- Technology used in industry, mathematics and science
- Activities that strengthen school-industry relationships

**STRATEGY:** *Support teachers as they develop Classroom Transfer Plans (classroom activities to implement lessons learned) to be field tested in classrooms during 1994-1995 academic year*

**ACCOMPLISHED**

- ♦ Four summer seminars focused on (1) teachers' orientation to site and GEMMA expectations, (2) networking with other teachers and mentors, and (3) development of Classroom Transfer Plans, with increasing focus on Transfer Plans as the summer progressed.
- ♦ 34 Transfer Plans were developed by the teachers, based on their experiences at area business and government agency sites, to address specific GEMMA themes. Transfer Plans are being field-tested in their classrooms during the 1994-1994 academic year.

### Common GEMMA Themes in 1994 Classroom Transfer Plans



#### 1994 GEMMA THEMES

Promotes **"Real World"** applications of mathematics and science

Promotes student **investigation**

Promotes **Teamwork**/cooperative learning

Promotes integration of **math and science** teaching

Promotes **communication** skills valued by industry

Promotes **attitudes** and interpersonal skills valued by industry

Promotes **technology** used in industry, mathematics & science

Promotes activities that strengthen **school/industry** relationships

Promotes **hands-on** activities

**STRATEGY:** Support teachers as they field test Classroom Transfer Plans in classrooms during the 1994-1995 academic year

#### ACCOMPLISHED

- Awarded 18 1994-1995 "Tool Kit" Grants--mini grants of up to \$175/teacher to purchase needed materials to implement Classroom Transfer Plans--totalling \$2,655.00. Funding will be used to help purchase a variety of support items, including topographical maps, computer software, thermometers, pipettes, calipers, a laser pointer and mousetraps.
- Teacher leaders are currently contacting other teachers by phone for updates and to address concerns.
- An academic-year follow-up session will be held in early 1995 to encourage and support teachers' sharing with each other.



**STRATEGY:** Disseminate field-tested Classroom Transfer Plans and other lessons learned to broader groups

**ACCOMPLISHED & CURRENT ACTION ITEMS**

- ♦ 75 teachers from 26 schools in 11 districts in Montgomery and Greene Counties participated in the Second Annual GEMMA Symposium in February, 1994. GEMMA and TRAC teachers and their mentors shared "hands-on," field-tested classroom strategies with participants who rated the day's usefulness and value 4.5 on a scale of 1 to 5.
- ♦ Plans call for the Third Annual Symposium to be held in February, 1995.
- ♦ More than 125 copies of Volumes I and II of "Let's Get Real: Mathematics and Science Problems from Dayton Area Businesses and Industries," field-tested applications problems and Transfer Plans generated by GEMMA participants, were distributed at the February Symposium and by mail to teachers as far away as New York and California.
- ♦ 25 teachers from 16 schools in 12 area districts participated in an on-site visit to EG&G Mound which was planned and implemented by EG&G Mound teachers and mentors. Participants rated the visit 4.2.
- ♦ Through a cooperative effort of the Alliance for Education, Wright Laboratory, GEMMA teachers, and members of the Alliance's Teacher Council, more than 700 "materials cubes kits," originally developed by WPAFB scientists to help GEMMA teachers teach the properties of materials, have been distributed to Dayton area teachers.
- ♦ Paul Fleitz, WPAFB Wright Lab Materials Directorate scientist and 1992 GEMMA mentor, has submitted a manuscript entitled "Demonstration Materials Properties Using Cubes" to the *Physics Teacher* magazine. In it he discussed the development of the materials cubes and their use in the classroom.
- ♦ As a result of her participation in Project GEMMA 1993, Ruby Bryant, a Colonel White High School chemistry teacher, received funding from the local American Chemical Society to attend the Society's national Biennial Conference on Chemical Education entitled "Learning Chemistry by Doing Chemistry." Wright Laboratory's Dr. Harvey Paige also presented a paper about Project GEMMA at the conference, held in August, 1994.
- ♦ Three 1994 GEMMA teachers recently made a presentation which focused on their classroom transfer strategies to the local chapter of the American Chemical Society.

**OBJECTIVE III:** To expose elementary teachers (K-8) who are Alliance S<sup>2</sup>MART<sup>2</sup> Grantees to the mathematics and science used in business and help them build a network of support through S<sup>2</sup>MART<sup>2</sup> BET (Business and Education Together).

**STRATEGY:** Recruit at least 25 teachers to participate in the four-day program.

**ACCOMPLISHED**

- ♦ 14 members of 1992-1994 S<sup>2</sup>MART<sup>2</sup> Grant teacher teams visited 5 sites for hands-on, interactive experiences.
- ♦ Teachers rated experience 9.85 on a scale of 1 to 10.
- ♦ Examples of activities included seeing real world problem solving in scheduling and routing at RTA, learning about the importance of saving money and building credit plus hands-on

experience encoding checks and deposits at Society Bank, and learning the fundamentals of lighting at DP&L's Energy Resource Center.

- ♦ GEMMA teachers and their mentors helped plan all-day visits for S<sup>2</sup>MART<sup>2</sup> BET teachers to the WPAFB Materials Directorate and Children's Medical Center.

**STRATEGY:** *Provide opportunities to build collegueship & explore ideas together.*

**ACCOMPLISHED**

- ♦ At a "reunion" held for teacher participants in the *Summer, 1993* Elementary GEMMA program, teachers shared strategies they developed to transfer lessons learned through their on-site experiences to their classrooms.
- ♦ An academic-year follow-up session open to all past GEMMA teachers (K-12) will be held in early 1995 at GM's truck assembly plant.

**OBJECTIVE IV:** To evaluate all components of the GEMMA program as they relate to GEMMA program goals and objectives.

**STRATEGY:** *Implement additional quantitative measures and collect pre and post-experience documentation.*

**ACCOMPLISHED**

- ♦ *1994 GEMMA teachers, site representatives and Academic Team members were all asked rate program goals and objectives on a scale of 1 to 5. Responses are recorded by group since perspectives differ.*
- ♦ *Three follow-up focus group sessions were conducted for 1993 GEMMA and TRAC teachers in Spring, 1994 by Tom Wilson, Sinclair Community College associate professor of Mathematics, and Katie Thorp, UDRI associate research engineer, to help determine the real classroom impact of the program. (See BUFF color pages for summary of results.)*
- ♦ The University of Dayton and Wright State University now offer GEMMA teachers one additional hour of graduate credit. Requirements include documentation of implementation of teachers' Classroom Transfer Plans and recommendations for improvement.

Project GEMMA results:

# 'Virtual reality' could be future science classroom

By VIVIAN WILSON  
SKYWRIGHTER EDITOR

If one area teacher has his way, future students will be able to access a "virtual reality" classroom to experience learning on a first-hand basis.

For instance, kids could step onto the moon with Neil Armstrong and discover the impact of that historic moment for themselves. Or they could take a walk through a factory to see the work environment as well as the production process. Or they could see the inside of a flower from an insect's point of view.

How could this be done? In the same manner that pilots can access virtual reality in the cockpit — through a head up display on a helmet.

Don Myers, a Wayne High School teacher, and Brian Tsou, Myers' mentor at Armstrong Laboratory, conceived the idea this summer. They were one of a dozen teacher/mentor pairs working at Wright-Patterson through Project GEMMA, a Miami Valley program designed to stimulate cooperation and inspiration between teachers and practitioners of math and science.

**In its fifth year, Project GEMMA is a program of the Alliance for Education, a coalition of corporate, foundation and education leaders from the greater Dayton area. GEMMA stands for Growth in Education through a Mathematical/Scientific Mentorship Alliance. Base people interested in becoming mentors in future programs should call Harvey L. Paige, Ext. 59038, or the Alliance for Education at 222-2934.**

The eight-week Project GEMMA program places teachers at work sites where they get to practice what they preach the rest of the year. If they are mathematicians, they apply mathematics to the real world of research or industry. If they're scientists, they test their theories with practical experiments.

And, just as their own students must do, the teachers learn to learn.

It's not as easy as it might sound.

Sharon Dutcher, in her third year with Project GEMMA, recalled the stress of that first GEMMA experience in 1992.

"I didn't know what to expect," Dutcher said. "I had been teaching 22 years without ever being in an industrial setting. You cannot believe how intimidating this (experience) is. By the second week, you're ready to quit. But by the seventh or eighth week, I could say 'I can do this math!' That was a wonderful experience."

"After going through this, you have more compassion for what (students) go through," Dutcher added. "You learn just how difficult it is just to ask a question."

Karlos Patterson, a ninth grade teacher at Miamisburg High School, expressed it similarly. "Students can



U.S. Air Force Photo by Spencer P. Lane

**Ken Steiger, from the Developmental Manufacturing and Modification Facility, shows a byproduct of the facility to Project GEMMA teachers, from left, Karlos Patterson, Bruce Carr, Steve Grain, Susan Kuehl and Sharon Dutcher.**

get lost when they start working with science," Patterson said. "They have the kinds of problems I've had this summer. I had to work through not understanding to get to where I understood what was happening."

"That's one of the values of the program. It puts us in the role of learner instead of teacher."

Patterson applied scientific skills on a particular materials problem, working with mentor Frances Abrams at Wright Laboratory's Materials Directorate. "We were pretty happy to have him," Abrams said. "He's been working on a project that we didn't have the manpower to get done."

Patterson's research and study of a composite resolved the mode of failure of the composite in high-temperature tests. "It looks as if we could derive from these results a system to use in future

See GEMMA, Page 18

# GEMMA

from Page 17

tests, and there's a potential for further research," Abrams said in praise of Patterson's work.

Patterson also sees the possibility of applying that scientific method to the classroom. "We'll follow this process from using scientific ideas to using materials - from making things, to making things work.

"I've been teaching for 28 years, and this has been the best learning program I've been in," Patterson added. "I'd definitely recommend it to anyone."

Breaking away from the norm is common in Project GEMMA. For instance, Dutcher asked to be placed in the Multi-Media Center, formerly known as Tech Photo, for the '94 season. Thus, for the first time in its five-year history, the project added a non-laboratory to its Wright-Patterson work sites.

Why did Dutcher want a photo and graphics lab for her work experience?

"Our kids are really into visual display; they're a TV generation," she explained. She plans to use her training at the Multi-Media Center to teach her students how to make signs. Signs? In math class? Sure, she

said: "Do you have any idea how many measurements are in signs?"

Lessons learned from past years help to improve Project GEMMA. "One of the things I learned last year was how to communicate using Internet (a computer network)," Dutcher said. "That became one of the goals of the program this year." Since then, a Project GEMMA bulletin board has been set up on Dayton Freenet, providing easy access and extending project benefits to other teachers.

Dutcher's Project GEMMA experience also led to application for and receipt of a \$12,000 grant for her school. The school also has formed a partnership with Wright-Patterson and has added the base as a field trip site for classes.

"I probably never would have conceived of doing any of this without my involvement in this program," Dutcher said of Project GEMMA. "It has been an instrument of change. I believe in the idea. It's great fun."

Future students should be able to

say the same, if Myers' "virtual reality" classroom comes into existence. Who knows the far reaches of math and science for future generations?



U.S. Air Force Photo by Verion Wilson

Don Myers explains his "virtual reality" classroom concept to a Project GEMMA participant during a final project luncheon at the Wright-Patterson Officers Club in August. Col. David A. Herrelko, commander, Wright Laboratory, was guest speaker. "The really neat thing about GEMMA is there's a lot of sharing," Herrelko told the group.

## Centerville students test Wright Lab software, FLASH

Centerville High School math teacher John Carroll will have his '94-'95 students apply critical thinking skills to a software developed at Wright Laboratory.

Carroll became aware of the software while working with mentor Tim Ross during Project GEMMA this summer. Ross is project engineer for a pattern theory group at Armstrong Lab.

Students will research patterns, a fundamental topic of mathematics and science, Carroll said. Using the pattern recognition software, FLASH, developed at Wright-Patterson, the students will help organize and analyze data and report their findings to Ross who is researching the "man vs. machine" aspect of pattern recognition.

Carroll called Project GEMMA "just terrific."

"There are applications and skills at Wright-Patterson that we (teachers) didn't know existed," Carroll said. "The base has such a large pool of expertise available."